

# The Mining And Metallurgical Journal

VOL. XX. No. 6

LOS ANGELES, CAL.,

December 15, 1898,

NEW YORK, N. Y.

Price 15 Cents

## Jessop's STEEL

The Best  
FOR

Mining Drills,  
Tools, Etc.

I. WILLARD BEAM,  
29 Main Street  
SAN FRANCISCO, CAL.



The Edward P. Allis Company  
MILWAUKEE, WISCONSIN

SEE PAGE 23



## Tremain Steam Stamp Mill

Great Capacity and Cheap Installation.  
1000 lbs. per hour to 40 mesh.  
Weight only 3300 lbs.  
Made Sectional also.  
All Claims Guaranteed.

GENERAL MINING MACHINERY



Gates Iron Works, Dept. 2,

650 ELSTON AVE., CHICAGO

THE  
ROESSLER & HASSLACHER Chemical Co.

100 William St., New York

## CYANIDE

Peroxide of Sodium

Hyposulphite of Soda

Chloride of Lime

Sulphide of Iron



And Other Chemicals for Mining Purposes.

## Joseph Dixon Crucible Co.

MINERS, IMPORTERS AND MANUFACTURERS

GRAPHITE PLUMBAGO

JERSEY CITY, N. J.

RETORTS, CRUCIBLES, GRAPHITE LUBRICANTS, BELT DRESSING,  
GRAPHITE PAINTS, LEAD PENCILS, AND GRAPHITE  
PRODUCTS OF ALL KINDS.

Send for Production Catalogue.

Graphite Makes the Best Lubricant and Best Paint.

## ADAMANTINE SHOES & DIES

AND

CHROME CAST STEEL

Cams, Tappets, Bosses, Roll  
Shells and Crusher Plates.

These castings are extensively used in all the Mining  
States and Territories of North and South America. Guarant-  
eed to prove better and cheaper than any others. Orders  
solicited subject to above conditions. When ordering send  
sketch with exact dimensions. Send for Illustrated Circular.

CHROME STEEL WORKS,

Kent Ave. & Kenp St., - BROOKLYN, N. Y.



Stamp Shoes

Stamp Dies



Stamp Cam

## The Pelton Water Wheel

Affords the Most Economical and Reliable Power for Mining,  
Electric and all other purposes.

9000 WHEELS NOW RUNNING

PELTON WATER WHEEL CO., 121 Main St., San Francisco, Cal.

Mexican, American and Foreign Patents,  
TRADEMARKS, ETC.

Reports on Mining and Other Properties.  
Proprietors of Weekly Anglo-American, a first-class Advertising Medium.  
Established 9 Years.

C. H. M. y Agramonte,

P. O. Box 388. Cable Address, "Agra"

CITY OF MEXICO, MEXICO



## Supplies and Machinery

OF ALL  
KINDS FOR

Mills, Smelters, Mines, Etc.

Act as Engineer advising as to Machinery and arrangement of same;  
complete working drawings furnished; Purchasing and forward-  
ing agent; Send for Catalogue

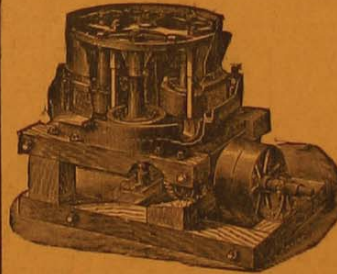
Chas. E. BILLIN Marquette Bldg., CHICAGO, ILL.

## PARKE & LACY COMPANY

21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

LICENSEE FOR THE MANUFACTURE AND SALE OF

## The Huntington Centrifugal Roller Quartz Mill



THE HUNTINGTON MILL is so well and  
favorably known among mining men throughout  
the world that any description of it would seem  
superfluous. They are in use in the United  
States, Canada, Mexico, Central and South  
America, Australia, China, Japan, and South  
Africa. In fact, wherever mines exist, and have  
given the best satisfaction of all quartz crushing  
mills.

The Construction of this mill has lately been much improved and we claim it to be the  
CHEAPEST, MOST EFFICIENT, SIMPLEST, AND MOST DUR-  
ABLE MILL UPON THE MARKET.

← CATALOGUE UPON APPLICATION →

OTTO HECKELMANN

FERDINAND McCANN

## ASSAYERS AND CHEMISTS

Heckelmann & McCann + + Bullion Dealers

Cash paid for all kinds of Gold, Silver and Ores. All assays  
and Chemical Analysis at Mexican Silver Rates, 50  
per cent. Less than American Price.

PUENTE DE SAN FRANCISCO No. 6

CITY OF MEXICO



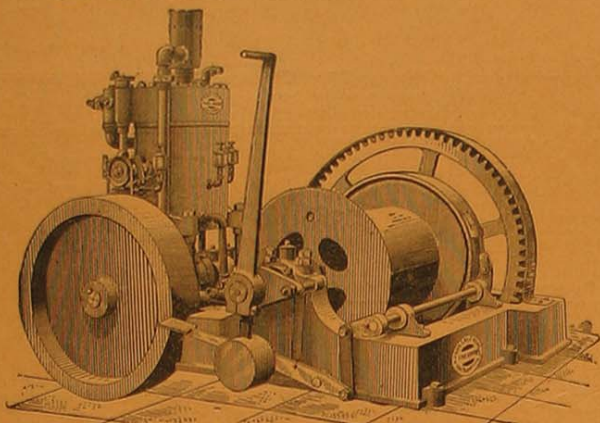
## California Vigorit Powder Co.

Manufacturers of

Dynamite High Explosives and "Vigorit Low" Blasting Powder

OFFICE: 208 California Street,  
San Francisco, Cal.WORKS: Point Isabel,  
Contra Costa Co., Cal.

## "Union" Hoist



Union Gas or Oil Engine and Hoist Combined, on strong, iron base.

**No Fire No Steam No Boiler No Danger**

TEN YEARS' EXPERIENCE. TWO THOUSAND ENGINES IN USE.

Started instantly. Compact, strong, simple, efficient, economical. Perfectly governed, so that oil is used only in proportion to the work done. No expense when idle.

Particularly Adapted to Mining in Localities Where  
Fuel and Water are Expensive.Built in the following sizes:—1 H.P., 4 H.P., 6 H.P., 8 H.P., 10 H.P., 15 H.P.,  
20 H.P., 30 H.P., 40 H.P.

Send for Catalogue and state what H. P. required.

**Union Gas Engine Co.,**

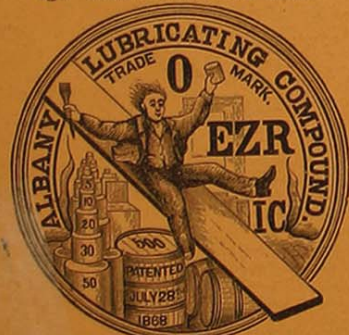
301 Howard Street.

San Francisco, Cal.

**WHITNEY COMPANY****Iron and Steel. Miners, Blacksmiths, Machinists Supplies**Agents for Arizona and New Mexico for Marsh Steam Pump. Agents Hercules High  
Explosives, Miners' Supplies by car load. Fairbanks-Morse Hoisting Ma-  
chinery and Engines. Full line of Steam Fittings and ENGINEERS  
Supplies. A specialty made of Supplying the Mining  
Trade of the SOUTH-WEST

ALBUQUERQUE

NEW MEXICO

The only Genuine ALBANY GREASE  
has this TRADE MARK on every pack-  
age. Look out for Yellow Label.MANUFACTURERS OF  
Albany Dynamo & Albany Cylinder Oils  
If you are not using these Oils give them a trial  
at once, and we know the result. You will want  
no other.**FRANCIS SMITH & CO.,**

MANUFACTURERS OF



MINING PIPE ALL SIZES

Hydraulic, Irrigation and Power Plants, Well Pipe, Etc., all Sizes.

Iron cut, punched and formed, or making pipe on ground where required. All kinds of Tools  
supplied for making Pipe. Estimates given when required. Are prepared for coating all sizes of  
Pipes with Asphaltum.

40 Fremont Street

San Francisco, Cal.

## Eclipse Sectional Rainbow Gasket

1/8 in. for pipe  
unions  
 1/2 in. for hand-  
holes  
 3/8 in. for man-  
holes  
 3/4 in. for extra  
large man-holes



FOR  
 UNION  
 STAND HOLES  
 AND  
 MAN HOLES

**Peerless Rubber**  
**Mfg Co.** 16 Warren St.  
 New York City

16-24 Woodward Avenue, Detroit, Mich.  
 Dunham, Carrigan & Hayden Co., San Francisco, Cal.



Trade Eclipse Mark Pat. 1891  
 Fac simile of a 6-in section of  
 Eclipse Gasket showing name  
 and Trade-mark imbedded

202-210 S. Water Street, Chicago, Ill.

## THOMSON & BOYLE PIPE WORKS

THOMSON &amp; BOYLE CO., Inc.

MANUFACTURERS OF

T. &amp; B.

**STEEL MINING PIPE**

**Cyanide Tanks, Water Tanks, Air Pipe,**  
**Hydraulic Mining Material**

310-314 Requesena St.,

Los Angeles, Cal.

## WILLIAM H. EMANUEL,

REPRESENTING

RAND DRILL COMPANY,  
 THE EDW P. ALLIS CO.,

Air Drills and Compressors  
 General Mining, Milling and Smelting  
 Machinery and Reynolds Corliss Engine  
 Wire Rope and Bleichert Tramways  
 General Service and Mining Pumps  
 ROBIN'S BELT CONVEYOR

DENVER

COLORADO

**RICHARD L. COLBURN,**

Stock and  
 Mining Broker

Member of  
 Salt Lake Stock and  
 Mining Exchange

SALT LAKE CITY,  
UTAH.**STANDARD BOOKS FOR MINERS.**

RECENTLY PUBLISHED.

**Mine Drainage**—Being a complete and practical  
 treatise on direct-acting underground steam-  
 pumping machinery, with a description of a large  
 number of the best-known engines, their general  
 utility and the special sphere of their action, the  
 mode of their application and their merits com-  
 pared with other forms of pumping machinery.  
 BY STEPHEN MITCHELL. Illustrated and many  
 folding plates, 276 pages..... PRICE, \$6.00  
**Earthy and Other Minerals and Mining**—A  
 companion volume to "Metalliferous Minerals  
 and Mining." A valuable work, both to the  
 student of Mineralogy and to the manufacturer.  
 By D. C. DAVIES. Second edition. 12mo, 336  
 pages, 76 illustrations, cloth..... PRICE \$5.00  
 Either of the above books, or any other book,  
 sent prepaid on receipt of price. Send for our  
 large Catalogue of scientific and practical books  
 which we mail free to any address.

NORMAN C. HENLEY &amp; CO.,

132 Nassau Street, New York, City

**TRIPP METALLIC PACKING**

FOR  
 PISTON RODS

Mining Trade  
Solicited

WM. B. MERRILL &amp; CO.,

SOLE MANUFACTURERS

Office and Factory,  
 295 Congress Street  
 BOSTON, MASSACHUSETTS

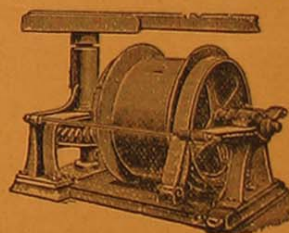
## PATENTS!

TOWNSEND BROTHERS  
 SOLICITORS  
 OF PATENTS

Patents on Inventions secured in all coun-  
 tries. Copyrights, Trade Marks and Labels.  
 OFFICE, 321 Potomac Block

Telephone 347.

Los Angeles, Cal.

**EL PASO AUTOMATIC HORSE WHIM**

This is the latest improved horse power hoist  
 offered prospectors, possessing all the best  
 features of other styles with improvements ad-  
 ded. The end thrust is entirely done away with,  
 thus increasing the efficiency and saving con-  
 siderable wear. The automatic safety break is so  
 arranged that accident is impossible, being in  
 position until held out by operator to lower  
 bucket. It is made entirely of iron and steel.  
 Weight, about 1,200 pounds. Heaviest single  
 piece, 275 pounds. Price, f.o.b. Colorado Springs, 300.  
 Cars, Buckets, Rope, Rails, etc.; The Climax  
 Engines. Manufactured by

**The Hassell Iron Works Co.,**

COLORADO SPRINGS, COLO., U. S. A.

\*\*\*\*\*

**JOHN STEWART****MINING ENGINEER**

Address:—Mining and Metallurgical Journal  
 LOS ANGELES, CAL.

Examiner and Reports on Mineral Properties

\*\*\*\*\*



## ALPHABETICAL INDEX TO ADVERTISERS

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y																																																																																																																																						
Abbott, W. O.	Baker & Adamson Chemical Co.	Cal Bellows Mfg Co	Dame, W. E.	Baker & Amend.	Baker & Co.	Baker Iron Works.	Baird & Co., Henry Carey.	Barnes & Co., W. F. and John.	Beam I. Willard.	Beckley & Co., A. J.	Bell, Newton M.	Bi Metallic Assay Office.	Bickford Drill Co.	Billin, Chas. E.	Blake Mfg Co. Geo. F.	Borden, Gail.	Booth & Co., C. B.	Bradley-Ramsey Lumber Co.	Brandis & Son, F. E.	Brown, Little & Co.	Brownell, James S.	Buff & Berger.	Buck Manufacturing Co., M. M.	Bullock Mfg Co., M. C.	Burlingame, E. E.	Garrett & Co., W. T.	Gaslight & Co.	Gates Iron Works.	Giant Powder Co., Con.	Glandine Co., James.	Gold & Silver Extraction Co. of America Ltd.	Goodyear Rubber Mfg Co.	Graphite Lubricating Co.	Grimwood Chas. P.	Gutta Percha Rubber and Mfg Co.	Hamlin & Morrison.	Hassell Iron Wks Co.	Harrington & King Perforating Co.	Harper & Reynolds Co.	Heckelmann and McCann.	Hercules Gas Engine.	Hendy Machine Works, Joshua.	Henley & Co., Norman W.	Henshaw, Bulkley & Co.	Hersey, Clarence.	Heer, Peter.	Hoff Asbestos Mfg Co.	Hoskins, Wm. J.	Hubbard, W. E. & Co.	Hunt, Fred. F.	Incorporated Mines Paying Dividends.	Ingersoll, Sergeant Drill Co.	Irving & Co., Jas.	Jackson Drill and Manufacturing Co., The.	Jeffrey Manufacturing Co.	Jessops Steel Co.	Jones, E. M., F. A.	Judson, A. F.	Keuffel & Esser Company.	Keystone Lubricating Co.	Kimbark, S. D.	Kohlbusch, Sr. Herman.	Krogh Manufacturing Co.	Lacy Manufacturing Co.	Lambert Hoisting Engine Co.	Leffel & Co., James.	Lehigh University.	Lexow, Theo.	Lidgerwood Manufacturing Co.	Link Belt Machinery Co.	Lord, Geo. W.	Machinery and Electrical Co.	Manasse Co., L.	Masters, J. H.	Mathison & Co.	Merrill, William B. & Co.	Midland Foundry and Machine Co.	Moller, E. C.	Montgomery Machinery Co., J. H.	Moore & Co Chas C.	National Iron Works.	National Pipe Bending Co.	New Haven Manufacturing Co.	Norwalk Iron Works.	Ogden Assay Office.	Ohlandt & Co., N.	Oregon Railroad and Navigation Co.	Oriental Gas Engine Co.	Pacific Tank Co.	Paraffine Paint Co.	Parke & Lacy Co.	Pelton Water Wheel Co.	Penn Smelting and Refining Co.	Peerless Rubber Manufacturing Co.	Philadelphia Book Co.	Pope, J. B.	Price & Son, Thos.	Pueblo Smelting & Refining Co.	Pulsometer Steam Pump Co.	Queen & Co.	Quick, John W.	Reed, John T.	Read, Edward B.	Ricketts & Banks.	Rio Grande Western Ry.	Risdon Iron Works.	Roessler & Hasselacher Chemical Co.	Robins' Conveying Belt Co.	Roller & Cummins.	Santa Fe Route.	S. F. Pioneer Screen Works.	Schoellkopf, Hartford and MacLagen.	Selby Smelting & Lead Co.	Simonds & Wainwright.	Smith, S. J.	Smith & Co., Francis.	Smith & Co., Wm. T.	Smith & Thompson.	Southern California Lumber Co.	Sprague, Timothy W.	S. S. Machinery Co.	State Ore Sampling Works.	Stewart, John.	Sullivan Machinery Co.	Surman & Co., J. R.	Tatum & Bowen.	Taylor & Co., John.	Taylor Iron and Steel Co.	Temple Machine Co.	Thomson & Boyle.	Tomlinson, J. B.	Townsend Bros.	Tremaine & Froehlich.	Trenton Iron Co., The.	Troemner, Henry.	Union Gas Engine Co.	Urie Mining Machinery Co.	Van Ande Copper & Gold Co.	Van Der Naillen, A.	Van Nostrand Co., D.	Voll, C. H.	Wade & Wade.	Warren, A. A.	Watson, R. N.	Weber Gas and Gasoline Engine Co.	Weber & Co., F.	Weigle Pipe Works.	Western Chemical Co.	Western Forge & Rolling Mills.	Whitney Co.	White Rogers & Co.	Wilcox & Rose Co.	Wimmer Geo.	Witte Iron Works Co.	Wonder Pump Manufacturing Co.	Wood, Henry E.	Woodbury Concentrator Co.	Yawger, I. C.

## Crude Platinum Purchased.

To Identify Crude Platinum when found, send 75c for Sample in glass, packed in a strong box. We purchase or refine anything containing Platinum.

BAKER &amp; COMPANY,

NEW YORK OFFICE: 121 Liberty Street.

NEWARK, NEW JERSEY



## Steel Water Pipe

Well Casing and General Sheet Iron Pipe

## OIL and CYANIDE TANKS

Dealer in CAST IRON PIPE

OFFICE: Room 2, Baker Block,  
Works, Cor. New Main and Date Sts.,  
LOS ANGELES, CAL.

## The CALIFORNIA ANTI-CALORIC COMPANY

Steam Pipe and Boiler Covering

Manufactured under our own Patents and solely from California Products.

ANTI-CALORIC PLASTER; the best and cheapest Insulating

Plaster in the Market.

Factory, Potrero. Tel. Main 5752 OFFICE: 507 Market St., San Francisco

## ASSAYERS AND CHEMISTS

Working tests of Ores by all processes.  
Samples by mail or express solicited

TREMINE &amp; FROELICH,

132 Third St., PORTLAND, OREGON

## LEHIGH UNIVERSITY

South Bethlehem, Pa.

THOMAS MESSINGER DROWN, LL.D., Pres.

Courses in Civil, Mechanical, Electrical and  
Mining Engineering, Metallurgy and Chemistry.  
Also Classical and Literary Courses. For further  
information, and for Registers, address, The  
Secretary of Lehigh University, South Bethlehem, Pa.

## A1--A WEBER Hoist is always A1

And they Always  
Give Satisfaction  
\* \*

The Buena Vista Smelting &amp; Refining Company,

B. F. MORLEY, Manager

BUENA VISTA, COLO. Sept 13-1898.

Weber Gas &amp; Gasoline Engine Co.,

Kansas City, Mo.

Gentlemen:-

Replying to your favor of the 12th inst: I have not time to  
write an extended letter. You may, however, quote me as saying that the  
hoist is A 1 in every respect, and entirely satisfactory.

Yours truly,

The Buena Vista S. &amp; R. Co.,



B. F. Morley  
Mgr.

Runs on Gasoline, Distillate or Kerosene, Sizes 4 to 100 H. P.

Get our New Catalogue—Tell us your requirements and we will save you  
some money Hoisting or Pumping or Running any  
kind of Machinery.

Weber Gas and Gasoline Engine Co.

434 S. W. Boulevard,  
Kansas City, Missouri



# CHAS. C. MOORE & CO.

ENGINEERS AND DEALERS IN

BABCOCK & WILCOX BOILERS.

McINTOSH & SEYMOUR ENGINES,

HAMILTON CORLISS ENGINES,

N. Y. SAFETY AUTOMATIC ENGINES,

GOUBERT FEED WATER HEATERS,

STRATTON STEAM SEPARATORS,

SNOW STEAM PUMPS,

QUIMBY SCREW PUMPS,

GREEN'S ECONOMIZERS,

WHEELER CONDENSERS,

BARNARD-WHEELER COOLING TOWERS,

HOPPE'S LIVE STEAM PURIFIERS

EDMISTON FEED WATER FILTERS,

BUNDY STEAM TRAPS,

SPENCER DAMPER REGULATORS,

HYATT ROLLER BEARINGS.

Watch this Space for description of the above Machinery.

Send for Catalogue and Full Information.

19 First Street, San Francisco, Cal.



GOODYEAR'S

RUBBER GOODS

— FOR —

Miners and Mining

GATHERING RUBBER Crack Proof Boots, White Rubber Coats, Oil Clothing

BELTING, PACKING AND HOSE

573, 575, 579 Market Street,  
SAN FRANCISCO, CAL.

R. H. PEASE,  
Vice President and General Manager.

73 and 75 First St.  
PORTLAND, OREGON

Chemical Processes Tested and Developed.

Alexander Elliott

Assayer and  
Analytical Chemist

614 S. Hill St., Los Angeles, Cal.

SETS OF ORES

Scientifically and Practically Arranged  
Invaluable for reference in the work of the pros-  
pector, engineer or chemist. Illustrated  
Catalogue Free

Prices of Collections \$3.00 and Upwards

Specimens Purchased

Of Ores or Fine Crystallizations  
Correspondence Solicited  
DR. A. E. FOOTE, 1317 Arch Street  
Philadelphia, Pa.  
ESTABLISHED 1876

Trade Mark

**JENA**

Normal Glass

**SCHOTT & GEN.**

**JENA**

BEST GLASS FOR Laboratory use

CHEMICALS AND CHEMICAL APPARATUS

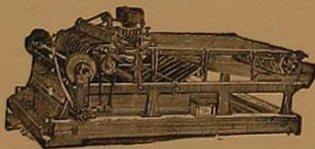
ASSAY BALANCES  
Finest Ever Made

Specialties:—Analytical Portable Balances, Porcelainware, Platinum goods, Crucibles, Cupels, Scorifiers, Muffles, Furnaces, C. P. Acids, etc.

Everything Necessary for Assayers

**Elmer & Amend,**  
3d Ave. Cor of 18th St. New York

WOODBURY CONCENTRATOR



No. 121 First St., - San Francisco

The Standard Authority

One Volume, Small Quarto, 313 Pages, 72 Illustrations, \$5.00.

A Practical Treatise on  
Hydraulic Mining in California  
By AUG. J. BOWIE, JR., Mining Engineer

CONTENTS

The Records of Gold Washing. General Topography and Geology of California; The Distribution of Gold and Deposits, and the Value of Different Strata; Amount of Workable Gravel Remaining in California; Preliminary Investigations; Reservoirs and Dams; Measurement of Flowing Water; Ditches and Flumes; Various Mechanical Appliances; Blasting Gravel Banks; Tunnels and Sluices; Tailings and Dump; Washing or Hydraulic Mining; Distribution of Gold in Sluices; Loss of Gold and Quicksilver; Duty of the Miner's Inch; Statistics of the Costs of Working, and the Yield of Gravel.

D. VAN NOSTRAND CO.

23 Murray and 27 Warren Sts., NEW YORK  
Copies sent by mail or express on receipt of price

MATTISON & CO.

29 LIBERTY ST,  
NEW YORK CITY

--- ANTIMONY ---

BUY

ANTIMONY ORES AND

CRUDE ANTIMONY

\* WRITE FOR FULL PARTICULARS

The Colorado and California  
Mineral Developing Company

432-3-4 STIMSON BLOCK, LOS ANGELES, CAL.

Prospecting, Developing of Mines, Mine Operators, Locating, Buying and Selling of Mines a Specialty, Financial Agents for Eastern Capitalists.

GAIL BORDEN, President  
J. A. COMER, Vice-President  
J. K. HAWK, Secretary

CAPITAL STOCK, \$200,000

Correspondence Solicited



Send for our Illustrated pamphlet

## ELECTRICAL FUZES

BLASTING MACHINES  
LEADING WIRE  
CONNECTING WIRE

THE AETNA POWDER CO.

188 MADISON STREET  
CHICAGO - ILL.



**A NEW MORTAR**

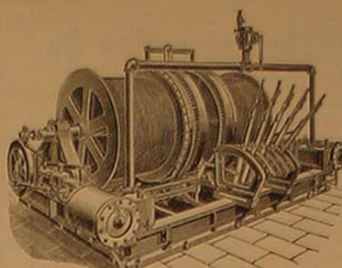
That is a crusher and pulverizer combined.



Weight 110 lbs.; Diameter 10 1/2 in.; Height 8 1/2 in.  
Fills a long-felt want. Send for descriptive circular. Crusher Pulverizer No. 1, \$25.00.  
J. E. Surman & Co., 74 Cortlandt St., New York

# Lidgerwood Hoisting Engines

Built to gauge on the Duplicate  
Part System. Quick Delivery Assured.



HENSHAW, BULKLEY & CO., Agents, San Francisco,

New York

# Mine Hoists, CABLEWAYS

Conveying Devices, for Mining, Quarrying,  
Logging, Dam Construction, &c.

Electric Hoists and Appliances

Lidgerwood Mfg. Co.

# STEEL CASTINGS

From 1 to 40,000 pounds  
weight

Of Open Hearth or Chester Steel. True  
to Pattern, Sound, Solid. Gearing of all  
kinds and Crank Shafts. Shoes, Dies,  
Crusher Plates, Bosses, Tappets and Roll  
Shells. Steel Castings of every descrip-  
tion.

Chester Steel Castings Co.,

Works Chester, Pa., Office, Library St.  
Phila., Pa.



# FOR SALE!


one 12x20 double Cylinder Hoisting Engine.

One 36"x24" Water Jacket Furnace, Boiler, Engine  
Blower, Rock Breaker, Scales, Shafting, Pulleys, Belting,  
Tools and all fittings and fixtures complete and new, built by  
Frazer & Chalmers; also one 16x42 Hamilton Corliss Engine;  
Will be delivered f. o. b.

W. E. DAME, CERRILLOS, NEW MEXICO

# UNFAIR COMPETITION

Our recent announcement that inferior goods had been sold and billed on the  
Coast as our goods, and that our trademark numbers had been counterfeited, has  
disclosed an even greater extent of these practices than we had supposed to exist.  
To make the resulting damage to the reputation of our goods as small as possible  
and to protect our would-be patrons we repeat:

All our catalogue goods, except those listed by us as manufactured by others,  
are stamped with our name "Keuffel & Esser Co." or our initials "K. & E. Co.,"  
and where there is room for it, with our trademark. Our German  
drawing instruments bear only the trademarks  only, and  
We never stamp our goods with catalogue numbers goods are  
goods so stamped are therefore not ours. All our fully warranted to conform to the description we give of them in our catalogue and  
to be of the quality and grade specified. We make some lines of cheaper goods for  
the jobbing trade, but they differ from our catalogue goods in quality and appear-  
ance. These inferior goods are not stamped with any of our trademarks. Our  
catalogue goods are not furnished to any dealer or agent without our complete  
stamp as described above, and any claim that we furnish our catalogue goods by  
special arrangement without our stamp is therefore an attempt to deceive. Our  
special papers in rolls or sheets

# Duplex Universal Anvil Baragon Normal

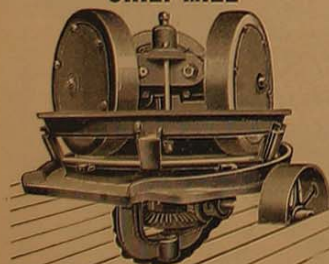
are watermarked or stamped along the edge with their name. Any claims that our papers are fur-  
nished by us in bulk without these names or that these papers have been obtained otherwise than  
through us, are absolutely false. We will thankfully accept any information bearing on the coun-  
terfeiting of our trademark numbers or the palming off of other goods as ours.  
Very respectfully, KEUFFEL & ESSER CO., New York

\* SCHOOL OF \*  
Practical Mining, Civil, Mechanical,  
Electrical Engineering, Metallurgy,  
Cyanide Process, &c.  
Surveying, Architecture, Drawing and Assaying.  
933 MARKET ST. SAN FRANCISCO, CAL.  
OPEN ALL YEAR  
A. VAN DER NAILLEN, President.  
Assaying of Ores, \$25; Bullion and Chlorination  
Assay, \$25; Blowpipe Assay \$10. Full Course  
of Assaying, \$50. Established 1864.  
Send for Circular

# The F. M. Davis Iron Works Co.

Office and Works 723 to 743  
LARIMER STREET,  
Corner 8th Street, DENVER, COL.

# THE DAVIS IMPROVED CHILI MILL



SIMPLE, DURABLE, EFFICIENT

Five-foot Mill, \$1,500.00  
Weight, 24,000 lbs.

SEND FOR CATALOGUES AND DISCOUNTS

# OUR New Book

# ESSAYS UPON

Boiler Incrustation and Corrosion.  
Boiler Explosions, The History of  
Natural Water Contamination.

BY GEO. W. LORD, is now ready

We will send this interesting little book free of  
cost to

EVERY SUPERINTENDENT  
OR ENGINEER

Who will state his occupation, By whom em-  
ployed. Total Boiler capacity. What Scale pre-  
ventive he is using. The cost of the article. And  
how long the supply will last. Address

Geo. W. Lord, Philadelphia  
Pa.

The Baker & Adamson Chemical Co.

MANUFACTURERS OF

Strictly Chemically Pure Acids and  
Chemicals and Ashless Filter  
Papers

EASTON, PENNSYLVANIA

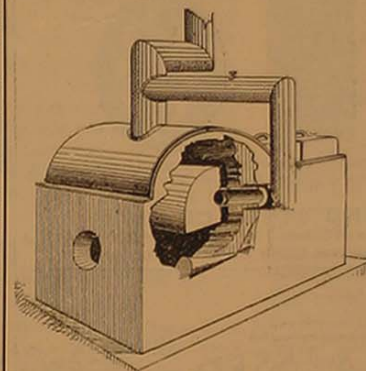
J. B. TOMLINSON, M. E.

Prescott, Arizona,

MINING PROPERTIES EXAMINED, AP-  
PROVED AND REPORTED UPON

Supervision taken of the development of pros-  
pects and the operation of mines.

# Combined Melting and Muffle Furnace.



This cut shows the Oxi-  
dizing Bonnet by which a con-  
tinuous flow of fresh air con-  
trolled by a damper is passed  
through the muffle.

For Sale by

B. M. CALKINS CO.,

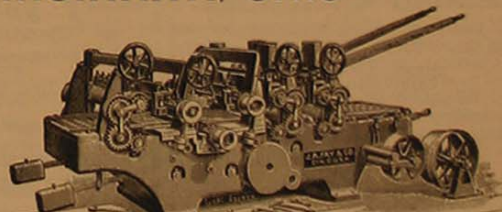
Assayers and Chemists, Refiners and Bullion Buyers.

127 West First Street,

LOS ANGELES, CAL.

J. A. FAY & EGAN CO.  
CINCINNATI, OHIO

# Wood Working Machinery



— FOR —

Box Factories, Planing Mills, Sash, Door & Blind Factories  
Carriage, Wagon and Agricultural Shops.

HENSHAW, BULKLEY & CO., Agents, San Francisco, Cal.

# Link Belt Machinery Co.

ENGINEERS, FOUNDERS, MACHINISTS

Designers and  
Builders of

CHICAGO, U. S. A.

LINK BELT Elevating and Conveying  
Machinery for Handling

Hot roasted Ores, Slag, Matte, Coal, Cement, etc., Electric  
Coal Mining and Haulage Machinery, Shafting, Pulleys,  
Bearing, Rope Sheaves, etc. Machinery designed and  
erected to suit existing conditions and available space.

Denver, Colo., 1328-17th St.







## The Gold and Silver Extraction Co.

OF AMERICA, Limited

Capital \$550,000

The Original Cyanide Process, Simple, Reliable, Economical  
Mine owners and others having Refractory and Low Grade Gold and Silver Ores and Tailings should have their material tested by THE MACARTHUR-FORREST PATENT CYANIDE PROCESS. Samples assayed and fully reported upon. Properties examined. Designs furnished. Particulars upon application.  
GEO. A. ANDERSON, Gen. Mgr. J. STANLEY MUIR, Technical Mgr.  
210 McPhee Building, Denver, Colorado

## Miners Attention!

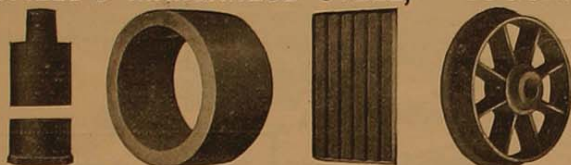
We Sell Powder, Caps, and Fuse, Mining Machinery, Belting, Asbestos Goods, packing of all kinds, Picks and Shovels, Iron and Steel; Iron Wheelbarrows, Ore Sacks, Tents, Portable Forges and General Mining Supplies. Agency Truax Mfg. Co and Studabaker Wagons.

WILCOX & ROSE CO.,

San Bernardino, Cal.

## HADFIELD'S MANGANESE STEEL,

HARD, TOUGH.



Best Metal known for Stamp Shoes and Dies, Roll Shells, Crusher Plates and Side Liners. Toggles and Toggle Bearings, Gyratory Cones and Concaves or Liners, Mine Car Wheels, Coal Crushing Rolls, Etc., Etc.

### TAYLOR IRON AND STEEL CO.,

Sole Licensees in America under Hadfield System and Patents.

High Bridge, N. J., U. S. A.

All Pacific Coast parties interested please address, Parks & Lacy Co., San Francisco, Cal.

**KEUFFEL & ESSER CO.**  
NEW YORK.  
127 FULTON AND 42 ANN STS.  
Branches: 111 Madison St., Chicago; 708 Locust Street, St. Louis, Missouri  
Drawing Materials and Surveying Instruments  
largest and best assorted stock in America. All requisites for field, mine, and draughting room. We have made a study of this line, and our goods are warranted to be as nearly perfect as it is possible to make them. Prices reasonable. Write for catalogue.

### MINING MACHINERY.

If you want mining machinery of the first class address the MINING AND METALLURGICAL JOURNAL, stating the purpose to which it is to be applied, and you will be placed in communication with the leading manufacturers of repute. All the latest catalogues of mining machinery are kept constantly on hand.

Stimson Block, Los Angeles, Cal.  
Room 17, 82 Nassau St., New York, N. Y.

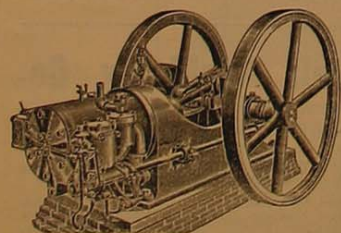
Fred. F. Hunt, E. M.

Chemist and Assayer

Weighing, Sampling and Assaying all Minerals  
Specialties: Lead, Bullion and Umpire Assays  
Samples by Mail or Express.  
77 Pine Street, New York City

See Incorporated Mines  
Paying Dividends page 22

## LAMBERT Gas, Gasoline and Distillate Engines



230 East Fourth Street,

TANKS, PIPE and WATER  
SUPPLY GOODS PUMPS  
of all kinds.

Call on or Address,

S. J. Smith,

LOS ANGELES, CAL.

**SIMONDS & WAINWRIGHT,**  
Chemical and Mining Engineers  
and Analysts  
Working tests of Ores by all Processes. Experimental Work on Chemical and Metallurgical Processes. Instructions in Assaying and Chemistry.  
No. 20 Platt Street New York

### SAVE MONEY! FUEL COSTS MONEY



Protect your pipes and boilers with Wm. Berkfeld's Fossil meal composition, packed in sacks, easy to transport anywhere. Send for facts and figures.  
FOSSIL MEAL CO.,  
2 Cedar Street, New York

### ASSAYER and CHEMIST

Mark samples plainly, advise by letter of full details, with charges enclosed. Postage on ore one cent per ounce.

C. H. VOLL,

34 Roxwell Bldg.

SEATTLE, WASHINGTON

## Mining Supplies and Steel

Blacksmiths and  
Machinists Supplies  
of all kinds.

Iron and Heavy Hardware, Wood Materials, Wheels, Hardware &c., for heavy freight wagons. Blacksmiths and Wagonmakers Tools and Machines. Send for complete catalogues.

S. D. KIMBARK,

80-82-84 Michigan Ave.,

Chicago, Ill.

## W. O. ABBOTT, ASSAYER

ASSAYING IN ALL ITS BRANCHES  
CHEMICAL DETERMINATIONS ACCURATELY MADE

TOMBSTONE - - - ARIZONA

## KEYSTONE LUBRICATING GREASE

The only grease adapted to all temperatures. It will not splash or drip like oil.

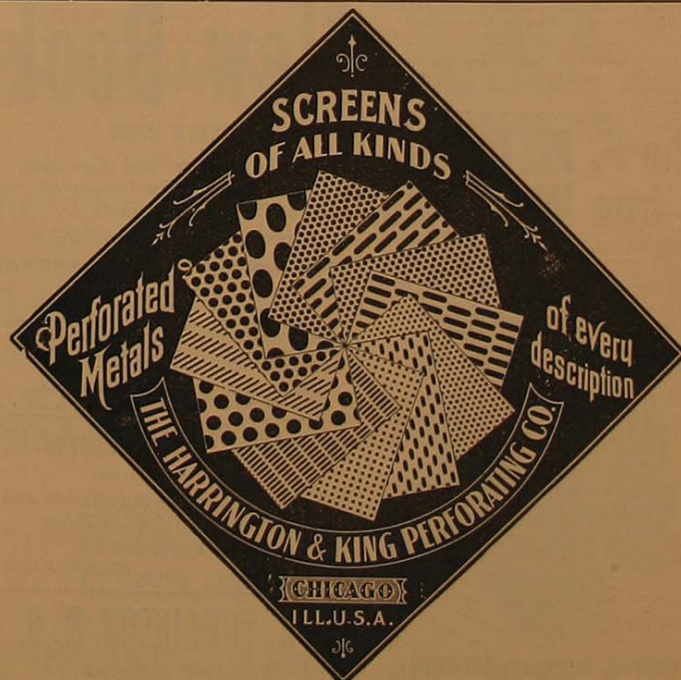


Our goods are not for sale by the Jobbing trade. If you want the genuine Keystone Grease it can only be obtained from us.

A full set of brass cups furnished FREE on first purchase

Especially adapted for Air Compressors and all kinds of Machinery in connection with Mines, Mills and Smelters. Send for trial sample and Cup Free of Charge.

**Keystone Lubricating Co.** 20th - Allegheny Ave.  
Philadelphia, Pa.



**The Harrington & King Perforating Co.**

127 N. Union St., Chicago Ill.

Eastern Office, 284 Pearl St., New York



ENTERED AT THE POST OFFICE AT LOS ANGELES, CALIFORNIA  
AS SECOND CLASS MAIL MATTER.

*F. W. EDELSTEN, Editor.*

O. S. BREESE, *Business Manager.*

JOHN STEWART, *Special Contributor.*

ULRICH KNOCH, Publisher

Stimson Block, Los Angeles, Cal.

Room 17, 82 Nassau St., New York, N. Y.

BRANCH OFFICES:

San Francisco, Cal.	64-65 Merchants Exchange.
Chicago, Ill.	413, 59 Dearborn St.
Denver, Colo.	402-403 Quincy Bldg.
Salt Lake City, Utah	15 W. Second South St.
Spokane, Wash.	Hypothec Bank Bldg.
City of Mexico, Mexico	No. 4 Calle de San Juan de Leiran

SUBSCRIPTION PRICE:

SUBSCRIPTION PRICE:	
For United States, Mexico and Canada.....	\$2.50 per annum
" " " " .....	1.35 six months
All other countries in the postal union.....	3.50 per annum
" " " " .....	1.75 six months

ISSUED SEMI-MONTHLY

ADVERTISING RATES FURNISHED ON APPLICATION.

AID THE STATE MINING BUREAU.

At the present time when the State Legislature is to be in session on the third proximo, is an opportune time to refer to the financial aid which the mining industry requires at the hands of our members.

Last year the printing appropriation was cut off, so that the work of the State Mining Bureau has not been published. The reports of the Bureau, as well as the special Bulletins on technical subjects, are of more than local or State interest, and have been in demand by outside parties, and cannot be obtained by even those who are resident taxpayers of this State. An economical policy on this subject is not the best means of advertising the mineral resources of this State, and of using means to attract capital to investment in our mines.

The Bureau has in course of construction a Register of mines and minerals of each county, to be accompanied by a county map. Each mine named in the Register will be marked with a corresponding number on the map.

These excellent county maps are a great aid to the prospector, miner and owner of mining property. It is therefore desirable that help should be given the State Mining Bureau in compiling such maps. These maps are not in all cases geological survey maps of the county where such county has not been reported on either by the Federal government Geological Survey staff or the State Mining Bureau officials, but consist of accurate topographical maps showing the location of mines, roads, trails, and for the southern counties, where springs are located. Such maps are a good means of advertising the mines and mineral resources of a district, as the mine owners will use them in attracting capital to their district. A liberal support in this respect is much needed for aiding the work of the Bureau, and in making it of greater benefit to the public generally. Advertising the State's resources is a wise expenditure in aid of increased information by means of the publications of the State Mining Bureau.

## PATENTING PLACER CLAIMS.

The custom of patenting placer mining ground is an injury to the mining interests of any section, whereas a lease from the government ought to be the manner of operating such claims. Placer ground is a knowable quantity, for work will determine its thickness, width and length. Its life of usefulness to the miner is only a question of time or extent, and when exhausted the mining rights ought to be vested in the government, so that any one else or the prior owner, in the event of the discovery of a ledge claim, could acquire and operate it as such. But that is not all the trouble inflicted by patenting placer ground, for the patent carries with it side and end line boundaries, which are vertical lines produced downwards or in depth, which restrict and prohibit the operation of deep mining on veins which may be and actually have been discovered on adjoining claims. Recent disputes as to title to the minerals under placer claims in several districts in Colorado, reported in the *Daily Mining Record* of Denver are evidence of the injustice done in patenting placer claims. This is evidence of the evil and undesirable consequences, which now attach to the wrong system of curtailing mining operations in depth, by confining the ledge miner, when the ledge dips at an angle from the vertical, within the confines of vertical lines for side line boundaries. It ought to satisfy the advocates of such a boundary that we have now got too much of it, and do not require any more to limit deep mining.

## THE LEGAL RATE OF INTEREST.

The legal rate of interest in any State has an appreciable effect on the industries of that section, and when too high, or if there is no limit, has an especially retarding effect on the obtaining of capital for new mining investments. For that reason, local capital in California is not so easily obtained as eastern or foreign aid.

The recent act of the Legislature of Oregon in reducing the legal rate of interest from 8 per cent to 6 per cent, could with profit to the mining development of California be made the same. It would have the effect of stimulating investment in local mining enterprises and in manufacturing. Under the present conditions of high interest rates, the loaning of money at usurer's figures is more profitable to the investor, than embarking in legitimate trade enterprises. So long as extortionate rates of interest are the prevailing source of income to money lenders, private parties look for higher rate of interest, and have no inducement to invest in trade risks such as mining. The approaching session of the Legislature is a fitting occasion to adopt a much needed change in this direction.

### GOLD IMPORTATIONS.

The influx of gold into this country for the last year and a half has had an important influence upon the financial conditions. The importation of gold has not equalled the balance of trade in our favor. The difference has been expended in paying the expenses of our travelers abroad, in payment of interest upon our securities held in foreign countries, and possibly in the extinguishment of foreign indebtedness. However, there has been a material addition to our gold resources.

The question is, where has it come from? Nominally from Europe, and most largely

from London. In trade with Great Britain the balance is uniformly in our favor, but in the world's commerce the balance is almost never against Great Britain, and is nearly universally in her favor, and hence her shipments of gold to this country does not deplete her gold resources. She makes it up, and more too, from the other countries with which she deals.

By importations of gold to this country, none of the European nations suffer from depletion except possibly Germany. She has lately been compelled to procure gold in London. The gold imported in this country indirectly comes from countries against which there are balances in trade with Great Britain. France is astute enough to maintain her gold resources unimpaired.

There has also been an increase of gold production in this country, because its great value has stimulated extraordinary exertions. The expectation in regard to the Klondyke output has by no means been realized; on the contrary, there has been grievous disappointment. Unusual importations, and production from our mines have materially increased our stock of gold, and have had the effect to strengthen the position of the gold standard advocates.

As a set-off to this the extension of our domains to the inclusion of some of the Antilles and of the Philippines, has created a demand for a larger volume of money and the use of more silver coin. Already the people of Cuba and Porto Rico are getting rid of Spanish silver coins and substituting those of this country. The Filipinos are silver using people, as are the Asiatics generally.

Whether we import gold or not depends upon trade balances, and they fluctuate. Our exportations of breadstuffs for the last year and a half have been unusual, and perhaps phenomenal, caused by providential favors to us and disfavor to several of the cereal producing countries.

The present condition is not one upon which to predicate a financial system for all time. There ought not to be final action until experience with our new possessions shall have demonstrated what our needs will be. Our domestic trade is increasing from many causes, among them being the growth of our foreign commerce and the increase of our population. Our money volume must be adequate to our needs as they shall be developed. It will be unwise to enter upon a policy of restricted volume, which will result from the adoption of a narrow metallic basis. It is better to err on the side of liberality than in the other direction. Our energies must not be crippled by want of a sufficiency of the tools of industry and commerce. Money is an essential tool of both.

## LEASING MINERALS.

The custom of working minerals on leased land and the working of portions of a mine under a lease are a quite common and at times convenient manner of operating to both owner and miner. The leasing of land for minerals by a company when left to the discretion of a mine manager is not always a safe investment for the company. The owner of the land takes it for granted that the mine manager has the authority to make such a contract and whether he has received authority or not from the company his actions in the matter are binding on the company. If the lease is made for a period of years on the annual rental plan during its continuance the company becomes liable for the whole payments during the term of the lease. In the



event of the minerals becoming exhausted the company is liable for the rentals during the unexpired portion of the lease. On this account the tribute or royalty plan is the safest manner of leasing minerals. The lessee pays for just the amount of ore he mines and his interests are to mine as much as possible, but some land owners prefer the annual rental plan on account of their knowing before hand just what amount they are going to receive. Under the annual rental plan it becomes necessary to have the lease drawn up by a competent lawyer and the condition included in it that in the event of failure to find ore or should the business become unprofitable at any time, the lessee has the right to terminate the lease. Leasing on royalty at so much per ton for all ore mined or sold is however the most common and satisfactory manner of operating under a lease and in the interest of the largest amount of output and profit to both parties, if a provision is included in the lease for conducting the mining operations in a safe manner for future operation of the property.

### CLOSED ITS DOORS.

One of Colorado's most worthy institutions has closed its doors. The Miners National Bureau of Information, which has done so much in the advancement of the Colorado mining industry is no more. The objects of the bureau were to advance the general prosperity of the miners and mining industries, whether gold, silver, copper, lead, iron, stone, marble, coal or any other material, as well as mineral oil and kindred interests; the investigation of all new methods of reduction and treatment of ores; to procure, preserve and disseminate information in relation thereto; to give assistance to the miner, the prospector, and the investor, by bringing them together and establishing a miners' market, etc., but its labors are at an end. The mining men of Colorado did not appreciate the faithfulness of its work; the assistance or advantages it gave, or the facilities it afforded, so through lack of support from the very people the bureau was formed to help, it has succumbed. We trust that it will be reorganized in the near future, and receive the support it is entitled to.

### STEAM BOILER HEATING SURFACE.\*

(BY CHARLES WHITING BAKER.)

It is a fact which is now generally understood by engineers, and all who have to do with steam power plants, that the power of any boiler, or more accurately the amount of steam which it can furnish in a given time, depends first of all upon its area of heating surface.

Of course the amount of steam which a square foot of heating surface will produce varies between very wide limits, and is affected by a multitude of conditions. It is also that heating surface is no more essential than the means for supplying heat—that is to say, a surface of sufficient size and grate surface to burn the fuel, and draft sufficient to supply the furnace with the necessary air.

The furnace and the chimney, however, are not necessarily parts of the boiler at all; their function is merely to supply the heat, and the function of the boiler proper is to transfer as much as possible of this heat to the water which it contains. Both the amount of heat

which it can transfer in a given time and the proportion of the total heat generated which can be transferred vary with the area of the heating surface exposed. In other words, both the capacity and the economy of a steam boiler depend directly upon its area of heating surface.

Evidently, then, the area of the heating surface of a boiler ought to be determined with a fair degree of accuracy. The designer of the boiler must know it, if, with any degree of precision, he is to adapt the boiler to the work which it has to do. The seller of boilers must know it, if he is to be sure of fulfilling his guarantees of capacity or economy; and the purchaser of boilers should know it, in order to determine what he is getting for his money.

As a matter of fact, a very large proportion of the boilers bought and sold are actually bought and sold by their heating surface. The prices asked for and quoted may be the price per horse power, but the horse-power is determined directly from the heating surface, the number of square feet allowed to a horse-power varying from 5 to 14, according to the type of the boiler. Again, in comparing the work done by the different boilers, the relative heating surface is always taken into consideration.

We need not go further for proof that accurate determination of boiler heating surface is a desirable thing. But we have now to notice the remarkable fact that in computing boiler heating surface, an error of from 7 to 17 per cent is made by a large proportion of steam engineers and boiler manufacturers.

The error to which we refer consists in taking the surface in contact with the water, instead of that exposed to the fire or hot gases, as the heating surface. If the heating surface is flat, of course the areas are the same; but boiler heating surface is in most cases made up of tubes, and the difference between the interior and exterior surface of a boiler tube is as much as 17 per cent of the interior surface in the case of a 1-inch tube and is about 7 per cent in a 4-inch tube.

The error arises in the first place from a failure to appreciate the fact that the heating surface exposed to the fire is the actual heating surface of the boiler, on which its capacity depends. A clear understanding of this fact is so important, and it has been and is so generally mistaken by engineers and writers of engineering works, that the writer ventures to submit a discussion of the elementary principles on which this assertion is based.

Suppose we have an iron plate one inch thick on the one side of which is flowing a current of hot gas at a temperature of, let us say, 1,000 degrees, and on the other side is a body of water in a steam boiler at a temperature of 300 degrees (corresponding to a gauge pressure of steam of about 52 pounds).

Now the heat in passing from the hot gas on the side of the plate to the water on the other meets with three different resistances as follows:

- (1) Resistance in passing from the gas to the surface of the plate.
- (2) Resistance due to the passage through the plate
- (3) Resistance due to the passage from the other surface of the plate to the water.

That the one of these resistances which is accurately known is (2), the resistance in the passage through the plate. The heat conductivity of metals has been carefully determined by experiment in physical laboratories, so that if we know the actual temperatures of two surfaces of a plate and its thick-

ness, we can at once determine how much heat is passing through a unit area in a given time. On the other hand, if we know how much heat is passing through the plate, we can determine what is the difference of temperature of its two surfaces. Let us solve an example of the latter sort:

Suppose the plate is transmitting heat enough to evaporate 3 pounds of water per hour from and at 212 degrees per square foot of its area, or about the average rate that the heating surface transmits heat in an ordinary stationary boiler. Since 965.7 heat units are required to transform a pound of water at 212 degrees into steam at the same temperature, the plate will transmit  $3 \times 965.7 = 2897.1$  heat units per square foot per hour, or for convenience let us say 2,900 heat units.

Now experiments on the conductivity of metals have shown that an iron plate, 1 foot square and 1 inch thick, whose opposite surfaces are kept at a uniform difference in temperature of 1 degree Fahr. will transmit in an hour 473 British thermal units.\*

Hence, to transmit 2,000 British thermal units per hour, the difference in the temperature of the two sides of the plate will be  $2,000 \div 473 = 6.13$  degrees.

I doubt not it will surprise many to learn that so small a difference of temperature between the two surfaces of an iron plate is sufficient to cause so large an amount of heat to flow through it; but the coefficient for the heat conductivity of iron on which it is based is the result of many experiments by the most eminent physicists, and is accepted as correct by the best scientific authorities, and there is no reason to doubt its accuracy.

Many engineering text-books and pocket-books still quote Rankine's formula and Peclet's coefficients for heat conductivity; but the latter have been found by the more careful research of modern physicists to have been largely in error.

In studying our present problem, however, the exact accuracy of the coefficient is a matter of no particular importance. We just found that boiler-heating surface 1 inch thick, when transmitting 2,900 heat units per hour, will have a difference of temperature on its two sides of 6.13 degrees Fahr. But we never have heating surface of such thickness in steam boilers. The shell heating surface in internally fired boilers is seldom over  $\frac{5}{8}$ -inch thick. Furnaces and fire boxes are made of  $\frac{1}{4}$ -inch to  $\frac{3}{8}$ -inch plates, while tube-heating surface is from 1-16 to  $\frac{1}{8}$ -inch thick.

We see then that the actual difference of temperature between the two surfaces of a boiler tube, transmitting heat at the rate already named, will be from an  $\frac{1}{8}$  to 1-16 of 6.13 degrees, or in round numbers from  $\frac{3}{8}$  degree to less than 1 degree Fahr.

As the eminent physicist, Lord Kelvin, has said, for all practical purposes we may consider that the heating surfaces of steam boilers conduct heat as if they were no thicker than paper, or as if the metal were of infinite conductivity.

It will be seen also that an error of 50 per cent, or even of several hundred per cent, in determining the coefficient of conductivity of iron, even if such an error were probable, would make no practical difference in this conductivity of iron, even if such an error were probable, would make no practical difference in this conclusion.

There are many facts of practical importance to be drawn from this. For example, in its light we can readily see how little reason there is to expect any greater economy

\* Paper presented at the Niagara Falls meeting (June, 1898), of the American Society of Mechanical Engineers.

\*Ganot's "Physics," 13th ed., page 378.



in locomotive boilers with brass or copper tubes and fire-boxes than in those of steel. Yet we still hear the superior conductivity of copper urged as a reason why English railways stick to the use of copper fire-boxes.

We know now that the two surfaces of the plate previously referred to (if we conceive its thickness reduced to that of an ordinary boiler tube), will have only a trifling difference of temperature. Next let us discuss the relative heat-absorbing powers of the water on the one side of the plate and the hot gases on the other. It is to be kept clearly in mind that the temperatures of the two sides of the plate which we have just considered are the temperatures of the skin of the plate itself, which is quite a different matter from the temperature of the air or the water in contact with the plate.

If this is clearly understood, it will be easy to understand that the actual temperature of the plate itself depends on the heat-transmitting power of the fluids on its two sides. If these fluids were the same on the two sides, and were at the same temperature and under the same conditions as respects mobility, then the plate temperature would be in a mean of the temperatures of the fluids on its two sides. But since water is many times as efficient as air or furnace gases in absorbing heat, the plate temperature will be nearly the same as that of the water and far below the temperature of the hot gases.

This is a fact which is a matter of common knowledge, and yet it has been overlooked by many engineers and by engineering writers; and because it has been overlooked is one main reason why engineers have not always insisted on the fire side of tubes being considered the heating surface of steam boilers.

Let us review some of the facts which show the relative heat-absorbing power of the water and gases. Take an iron rod and heat it to redness, and then let it be held still with only the air in contact with it, and see how long a time elapses before it is cool enough to be touched. Heat the rod to redness again and then plunge it in water, and again note the time before it can be touched. We have then a very rough approximation of the relative heat-absorbing power of air and water.

Again, experiments have been conducted to determine the temperature to which a metal plate could be heated when one side was in contact with water. The temperature was determined by inserting in it plugs of various fusible alloys, and the fire side of the plate was then subjected to the most intense heat that a powerful blow-pipe could produce. So long as the water side of the plate was clean, it was impossible to melt the fusible plugs. It may be well to point out that this method of determining the maximum temperature reached by the plate is subject to more or less error, on account of the obstruction to the passage of heat from the plug to the metal of the plate (the plug being merely embedded in the surface of the plate and not passing entirely through it). Any joint between two metal surfaces interferes with heat conductivity, just as it does with electrical conductivity. The amount of interference depends upon how intimate the contact is between the metals, the amount of oxides (if any) between them, etc.

The most striking illustration, however, which the writer has ever seen of the large heat absorbing power of water, as compared with air, was an experiment conducted by him, for another purpose, some years ago. A vessel having a single vertical tube, of about 2 inches diameter, was filled with cold water

(45 degrees to 50 degrees Fahr.); the hot gases from a large oil lamp or a Bunsen burner, at a temperature of some 1000 degrees or more were then passed up through the tube. The surface of the tube exposed to the hot gases was kept so cold by water on the other side that drops of dew were condensed upon it from the hot gases, and the interior of the tube became actually coated with dew, which remained until the water was warmed to about 60 degrees. I advise any one who may not be convinced as to the enormous heat-absorbing power of water as compared with gases to try this simple experiment.

(To be Continued.)

### Concerning Lead Peroxide.

LOS ANGELES, Cal., Nov. 8, 1868.

EDITOR JOURNAL.—Having occasion to use some peroxide of lead, and not knowing how it is manufactured, I ask your aid in the matter. Can it be made in sheets and cut or shaped as desired? If so, what is the method? If it is sold in sheets, where can it be had? Are battery cells manufactured in this State or west of the Mississippi?

ENQUIRER.

Peroxide of lead ( $PbO_2$ ), also called brown oxide or binoxide of lead, is a compound formed by the combination of an atom of lead ( $Pb$ ) and two atoms of oxygen ( $O$ ). It is a dark reddish brown amorphous powder, insoluble in water, and has a specific gravity of 8.902—9.190.

It is prepared by dissolving the protoxide of lead ( $PbO$ ) out of red lead ( $Pb_3O_4$ ) with dilute nitric acid. There is formed thereby lead nitrate,  $Pb(NO_3)_2$ , which goes into solution and there remains the insoluble powder of lead peroxide above mentioned.

It cannot be rolled into sheets, neither can it be melted into a bar, as heat would decompose it, leaving litharge or protoxide of lead.

We do not know of any process for making sheets of peroxide of lead. We are unable to ascertain where sheets of peroxide can be obtained; probably some of our readers can supply the desired information.

The battery cells referred to by our correspondent evidently are storage batteries, and in these various preparations of lead are used, peroxide of lead among others. Each manufacturer varies this and keeps the matter of composition and formula of this lead paste a trade secret.

In reply to the last inquiry we can state that we do not know of any extensive battery manufacturing plant west of the Mississippi river. The largest manufacturers are the Chloride Accumulator Company, located in Philadelphia.

Extensive improvements is the order of the day at the establishment of B. M. Calkins Co., the assaying firm located at 127 West First street, Los Angeles. They are re-arranging, refurnishing and handsomely equipping their compartments so as to be able to speedily and accurately turn out the increased amount of assaying, chemical and analytical work coming in. Their office and reception rooms will be enameled in white and gold, presenting a pleasing appearance to the eye of one entering.

The Jackson Drill and Manufacturing Co., of Denver, are making an effort to introduce their Hand Power Rock Drills in California and the Pacific Coast generally. They have already succeeded in placing a goodly number, and bid fair to make a good business from the coast trade.

A very neat pamphlet is issued by the Crescent Steel Co., of Pittsburg, Pa. It is a work of art, and is entitled *Steel Making*, and gives a short historical synopsis of the advancement made in the manufacture of steel, while the principal feature of the pamphlet is a description of the Crescent Steel Company's Works. The plant comprises 15 main departments, bristling with their hundred or more stacks. These consist of the Melting department, 10 Rolling mills or trains, the Iron Finery, the Forge and Hammer department, a Rod and Wire Factory and a Spring Shop. In addition to these are Annealing Furnaces, Iron and Steel Warehouses, the Motive Power department, the Electric Lighting and Power department, and others.

James Irving & Co., the gold refiners and assayers, have secured quarters formerly occupied by the firm of Smith & Irving at 128 North Main street, Los Angeles, Calif. When thoroughly arranged, according to the plans and intentions of the firm, this establishment will be one of the largest and most complete plants for the testing and assaying of ore in Southern California.

We are in receipt of S. D. Kimbark's catalogue of blacksmith, mining and wagon supplies. The house is in Chicago and one of the most complete of any in the United States. Aside from the neat and convenient form of this catalogue, and the splendid half-tone likeness of Mr. Kimbark as the frontispiece, the book is very comprehensive, bound in cloth, and a poetic novelty to the trade. Mr. Kimbark has such good faith in the future of the great West that he has selected the MINING AND METALLURGICAL JOURNAL as the only publication in the United States to advertise his wares in. We appreciate his good judgment and bespeak a prosperous year for the house of which he is head.

The first section of the Register of Mines and Minerals, to which the State Mining Bureau is devoting most of its energy, was displayed in proof at the annual convention of the California Miners' Association held in San Francisco, Cal., on the 21st, 22nd and 23rd of November, and its publication will soon follow. This is the one dealing with Nevada county, and State Mineralogist A. S. Cooper hastened it for the occasion, having printed and prepared it at his own expense. Its dozen or so of pages are wide and give in tabulated form a variety of information about 300 or so mining properties of all sorts in that county, including about sixty mills. A map 30 inches long by about 24 inches wide will accompany the register, and it will show the topography, roads and trails, developed mines with reference numbers, water and electric power plants, etc. It is in three colors. This first register is issued through a special arrangement, the State Printer being unable to handle such work by lack of funds. Twenty other county registers are completed in manuscript so far, and will be published when the State Printing Office can do the work. Each one is revised by a deputy appointed in each county and familiar with the mining field. Charles Uren has revised the work for Nevada county after compilation from existing information at the bureau. The value of the work is rather lessened by the remarkable unwillingness of mine-owners to give information about their properties. In Tuolumne county but seven responded, and hence the information given is largely that gathered from general report and the judgment of the deputy.



### JEFFERY ELECTRIC LOCOMOTIVE FOR IRON WORKS.

The demand for an electric locomotive for use about iron works and steel mills lead to the designing of such a machine by the Jeffery Manufacturing Co., Columbus, Ohio.

This type locomotive was designed to meet the demand and was based upon the experience the manufacturers have had in the construction of such machinery. That it has proved a success is demonstrated by the number installed since placing on the market. It was designed with a special view of making it easily handled, compact, strong and having all parts easily accessible.

The frame consists of two solid gray iron castings, securely bolted together with turned bolts in reamed holes. This frame can be mounted either inside or outside of wheels, according to gauge of track on which the locomotive is to operate and rests upon four spiral springs supported by journal boxes of the standard railway type. There are four wheels and two axles, the wheels are of the open plate chilled type and are keyed as well as forced onto the axles.

The axles are of hammered steel accurately ground and turned down.

There is but one motor mounted in such a manner that it receives no injurious vibration when locomotive is in operation. The motor is of the multipolar type, series wound, with iron clad armature and designed especially for this class of work. The armature and field coils are completely encased in the cast iron field frame and are thoroughly protected from injury.

The entire internal mechanism of the locomotive is fully protected by a covering which is hinged on the frame in such a manner that it can be raised and the motor reached with ease. The locomotive is provided with gong and head light.

The controller is located on one end of the locomotive in such a position that the controller wheel, brake wheel and sand box lever are convenient to reach without delay when necessary.

The sand boxes are located so that the sand

is delivered in front of the driver when running in either direction.

The trolley is so designed that it can be reversed by the operator without leaving the seat.

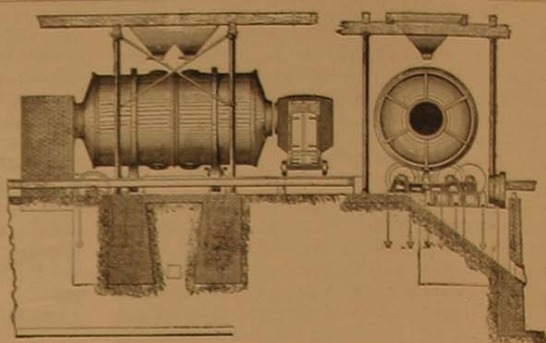
The illustration given herewith shows the locomotive complete ready to operate. The locomotive is well fitted for the work which it was designed to perform and as an up-to-date piece of machinery is only another evidence of the reputation of the manufacturers.

The demand for electric locomotives makes this invention very valuable.

### ROASTING FURNACES.

The natural tendency of news gathering in engineering as in other matters is to give prominence to claims of novelty. Of even greater value however and not so often presented are the records of long and successful service. Ten years ago one hundred and fifty six (156) large Bruckner Roasting Furnaces were furnished by Fraser & Chalmers, 133 Fulton St., Chicago, Ill., for the Anaconda Copper Mining Co. These are still in active and successful service. When we consider the size of these furnaces 8 ft. 6 in. diameter by 18 ft. 6 in. long inside dimensions, and the space required by so many of them, it is a commentary on the magnitude of the Anaconda works which calls for no additional remark. Since that time many of these furnaces have been supplied to large metallurgical work. These are in some cases of larger size, but of similar design to the illustration which shows the brick lined fire box mounted on wheels, and gives a clear idea of the method of driving, discharge chutes and other details. This style is used on ores, but for the heavier concentrates the cylinder is driven by a pinion meshing with a large spur gear encircling the furnace. The fire boxes are sometimes built stationary. The revolving furnaces are lined partly with fire brick and with common brick. The time of roast and speed of rotation are easily varied to suit the ore.

These furnaces have been built with special modifications such as arrangements for continuous feeding and discharge, and blast piping for oxidizing the roast. Roasting however usually requires to be done gently. The process cannot be forced without going too far; either sinthering the ore or wasting values. For ordinary purposes the ore is sufficiently stirred and oxidized by the rotation of the barrel, and the satisfactory service of the regiments of these roasting furnaces at the Anaconda works would seem to leave little to be desired.



BRUCKNER ROASTING FURNACE.

### Railroad Commission's Investigation.

What some people were so bold as to predict almost three months ago, has come to pass. The railroad commission's investigation into the alleged extortionate ore freights has been dismissed, or at least such disposition of the case has been sought by the petitioners. The following request was filed in St. Paul.

Duluth, Minn., Nov. 25, 1898.—To the Honorable the State Board of Railroad Commissioners, St. Paul, Minn: Gentlemen—In view of the very protracted and expensive character of the proceeding for a reduction of rail rates on iron ore, and the apparent indifference of land owners generally, who are equally interested with ourselves in the result, we have concluded that we will not continue to bear, substantially alone, the accumulating burden of expense, and herewith enclose a certificate of the dismissal in that matter.

J. G. BROWN, WM. J. CONAN, ELIZA CONAN.

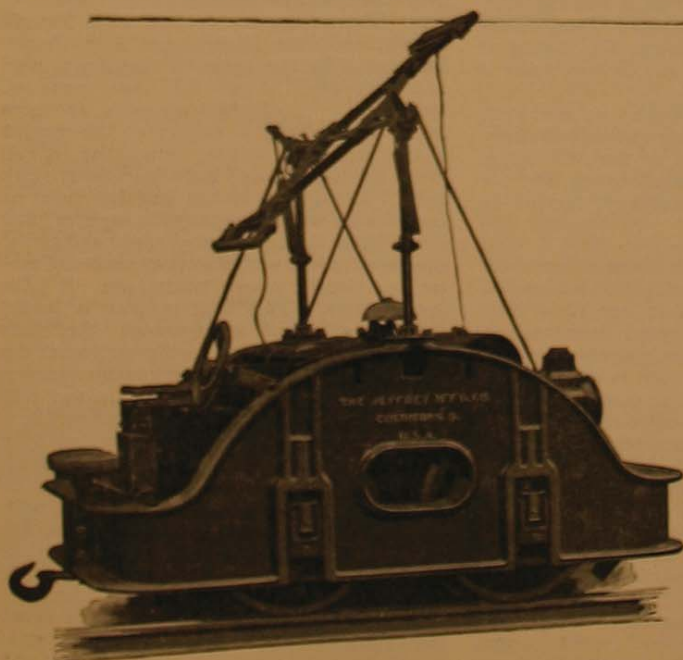
The investigation, it will be remembered, was begun on the petition of these owners of mining properties, who, however, it was admitted, represented also other parties so interested. The two railroads appearing as respondents—the Iron Range and Misabe—at once made preparations to contest the charge.

J. G. Brown says in explanation of the continuance that he was informed that he was left to fight the case alone by furnishing the considerable money required to do so or to join in requesting a dismissal, the latter of which courses he finally concluded to take.—*Duluth Tribune*.

### The Greatest Mines in the World.

More gold-bearing rock is being crushed on Douglas Island, Alaska, than in an equal area of any other country in the world.

The Treadwell and allied companies now have 880 stamps set up—540 on the Treadwell, 120 on the Mexican, 100 on the Union, and 120 on the Ready Bullion—and the engineers will soon turn over the mills to the companies as completed. These mills will easily crush 2000 tons of ore a day. It is not believed there is any place in the world, South Africa, Australia, or anywhere else, where so much rock is being crushed on so small a space of ground. The Treadwell now has 8,000,000 tons of ore in sight. The Ready Bullion promises to equal the Treadwell in the amount of its production. All the dirt has been sluiced off and it has been traced for 300 feet along the beach and 600 to 700 feet along the hill. It is from 30 to 100 feet wide on the surface, and is in the contact between greenstone and slate, as are all the Douglass Island ledges, the ore being of the same character as the Treadwell. The shaft is down 650 feet under Gastineau channel and the ledge has there widened out to over 200 feet and carries from \$12 to \$14 in gold throughout.—*Arlington (Ore.) Record*.



JEFFERY ELECTRIC LOCOMOTIVE



## JEFFERSON COUNTY MINES.

The mining town of Basin, Montana, is situated in Jefferson county, about thirty miles southwest of Helena, the capital of the state, and about twenty miles northeast of Butte, the world-famous smelter town. It lies in a great mineral belt, but has not received the attention it deserves. There can be no accounting for the neglect of this section or, for that matter, the whole of Jefferson county, other than that the country was thought to have been prospected years ago, and while mineral was known to exist it was not thought to be in sufficient and paying quantities to warrant working. This, to a certain extent, is true, for the ores of this district, wherever opened to sufficient depth, invariably prove them to be concentrating and generally what is known to be low grade; nevertheless, when opened up are in abundance, but at the same time necessitating the expenditure of a large sum of money in erecting concentrating machinery, something that the majority of claim holders fail to possess. Another feature of the mineral deposits of Basin and the Cataract—they lie in great depth. This is almost invariably true and the few exceptions are really noticeable, as their number can be readily distinguished. Nearly all the prospecting done has been in the form of tunnels, and in many places these are extensive. To mine in this sections, deep shafts must be sunk tapping the pay ore at a depth of from 200 to 500 feet.

The most notable instance proving this assertion may now be seen in the famous Hope mine. For years, off and on, prospectors had worked on this claim, always in ore, but too low to ship and pay smelter charges and until the present owners took hold and sunk the shaft to the 200 foot level the property was not considered of much value. Every foot that is sunk additional proves the property to be of greater value.

The Hope is among the most prominent mines now in operation; it is owned by the Basin Mining Co. The officers and directors are composed of R. B. Smith, president; C. A. Whipple, secretary; A. E. Spriggs, treasurer, and M. L. Hewett, general manager. E. C. Gilbert is the superintendent and employs nearly fifty men. The lead runs almost due east and west and varies in width where worked from 16 to 30 feet. Many rich shoots of ore have been encountered. Considerable development work has been carried on and

and more than 20,000 tons of ore has been stoped out.

The mill was originally built for a capacity of 100 tons of ore per day, but it has at times been crowded to reduce 150 tons of ore per day. The ore is a first class concentrating proposition and readily reduces from six to ten tons into one, making a concentrate valued at from \$50 to several hundred dollars.

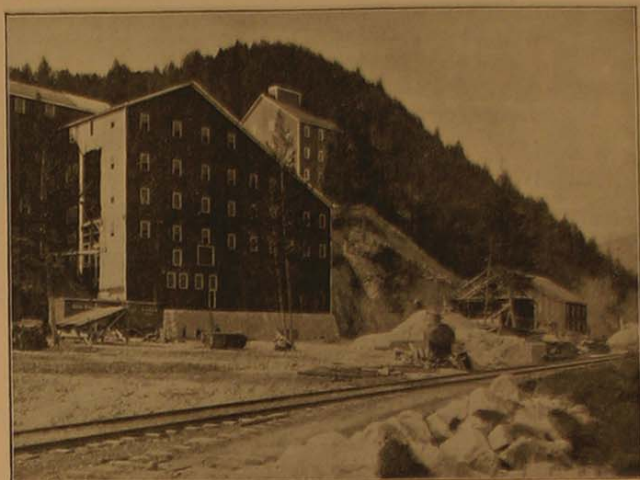
The Katie, the adjoining claim, is an extension of the same lead as the Hope and is owned by Massachusetts capitalists. Previous to the fatal fire which occurred August 13, 1895, the property was equipped with the finest concentrating plant in the west, and a hoisting plant suitable to develop and work the property to a depth of at least 500 feet. The shaft on the property is a double compartment and perpendicular.

The company rebuilt the milling plant on a much larger scale, and it has a capacity of handling 500 tons of crude ore per day. A smelter is also in the course of erection to treat the concentrates from this property as well as ores from other mines in the Basin and Cataract districts.

Between Basin and Helena, about midway, the towns of Wick's and Corbin are located, on a branch road of the Northern Pacific Ry. These camps are also within an extensive mineral zone and a number of good properties can be seen scattered here and there.

The Alta mine has been in constant operation for nearly twenty years past and may be considered the peer of any in the country in the production of the precious metals. The mine is located northeasterly from the town of Wickes, a distance of two and one-half miles. The lead varies in width from forty to sixty feet. It has for years been worked by tunnel to a depth of 800 feet. In this tunnel there is a station, 1,200 feet from the mouth, in which is located an electric hoisting plant and a three compartment shaft from which levels have been run. The ore is taken from these and hauled through the tunnel to the surface by mules, where it is dumped into the ore bins and then hauled by cars to the concentrators at Corbin.

The mine is located on what is called Alta mountain, which rises high above any of those surrounding. The formation of the country rock is a porphyry and granite and the vein is a true fissure contact. The minerals contained are gold, lead, silver and copper, averaging



KATIE CONCENTRATOR DESTROYED BY FIRE, AUGUST 13TH, 1895.

about \$12.00 per ton of all metals contained in the ore.

The ores are run to Corbin, three miles, on a narrow gauge railroad, the property of this corporation, over which they haul 350 tons per day to the concentrator. From Corbin the concentrates are shipped to East Helena to the company's smelting plant. About 180 men are unemployed in and about the mine and mill.

The high grade silver producing district of Lump Gulch is located between Corbin and Helena, embracing a tract estimated at about eight miles long by about four miles across, containing Lump, Clancy, Strawberry, Shingle and Warm Shingles gulches, being about twelve miles south of Helena. The country rock of the silver belt is a coarse grained micaceous granite, in which the ore producing veins are fissures, having a strike across the granite formation nearly east and west.

To the Hon. Thomas G. Merrill belongs the credit of first demonstrating to the world that the mineral bearing ledges of Lump had their smaller ends up and that a moderate amount of development was required to uncover some of the richest silver ores ever mined. Mr. Merrill was present in the gulch at the first stampede into the district; soon after, in 1866, he located a quartz claim on ground now included in the Liverpool property, but afterwards he abandoned it. Returning to the gulch in the early 80's he again located the ground, calling it the Liverpool, and began prospecting it with a view of further development. On account of shortage in his funds this development was delayed until about five years ago, when Mr. Merrill associated John S. Miller of Helena with himself in the property. Only a few weeks of active work and the expenditure of \$1,000, sufficed to disclose large bodies of ore running hundreds of ounces of silver to the ton, and to put the Liverpool on a dividend paying basis, where it has since remained. Within eighteen months thereafter the two fortunate owners divided up the immense sum of \$200,000 profits between them.

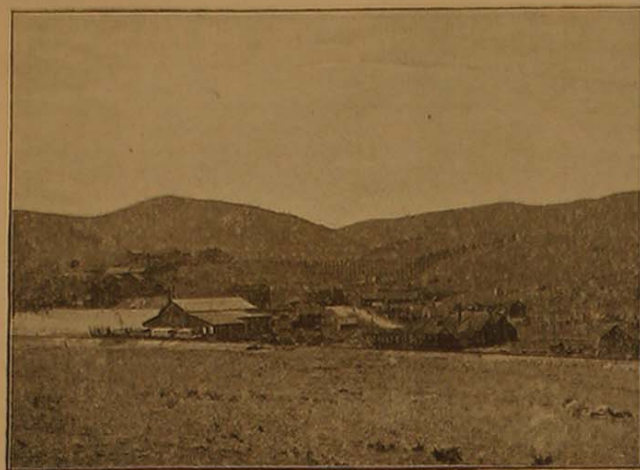
The mine is located on the north side of Lump gulch, near its mouth, about three-fourths of a mile from Hartford station. The richest ore and largest body of it is found in the 400 foot level, where ore running 800 to 1200 ounces silver per ton are frequently encountered, besides a large pay streak having a value of about 200 ounces per ton.

Among the other mines of the district are



THE ALTA MINE AT ALTA.





ALTA CONCENTRATOR AT CORBIN.

the Washington, Little Nell, Free Coinage, Little Alma, Old Dan Tucker, King Solomon, New Stake, the well known Legel Tender, the Harvey, Rose, Wickes, Norma, Hope, Baby, Helen, Tycoon, Haldemac, the Thursday, Lone Star, Horseshoe, Oxshoe, Little Katie and the Mipsic.

Ledge mining in the vicinity of Whitehall in the southern portion of Jefferson county has been carried on with one exception in a desultory way only about three and one-half years. In times past considerable placer mining was done in the Pipestone district and quite successfully too; and at present in a small way on the Little Pipestone. Southwest of Whitehall there are numerous silver properties that were valuable when, "silver was silver", and mostly patented properties, that will again be valuable some day. In the same district there are a number of fine copper prospects which have also laid dormant for years, but the present flurry in the copper market having stimulated the pursuit of copper mining these claims are again attracting the attention of mining men of note. There are also a few good gold prospects in the same locality notably among which is the Golden Valley. North of this is the Columbia another producer. There can be little question about the country on every side of Whitehall being rich in mineral resources of almost every description. To the northwest are good lead mines which in better times yielded good values. In the immediate vicinity of the lead mines are silver and gold prospects which already give strong evidence of proving good mines with development, the ores being very similar to the Golden Sunlight group five miles easterly from Whitehall; that is the gangue or vein filling is quartz, rarely spar, at places porphyritic matter, clay and crushed and brecciated slate, all of which are generally cemented or heavily impregnated with iron pyrites and quartz.

Adjoining the Sunlight properties is a group of copper properties known as the Honaker group which show immense deposits of the red metal.

About five miles still eastward are the North Boulder properties, the vein running back from Jefferson Island, a distance of nearly two miles. The Whitmore-Brooks properties yield as high as 40 per cent. copper and a little gold and silver.

The building of the Parrott smelter near this place was the principal stimulating agent for development of prospects of all kinds, es-

pecially gold and copper, and in the last two or three years the vicinity of Whitehall has become one of the great gold and copper producing districts of the great state of Montana.

With the advancements made in treating low grade ores this section has taken an enormous stride forward. It is gratifying to witness the results in the milling of Jefferson county ores, which has been accomplished in the last few years; and prospects are bright for greatly increased outputs in the future.

The series of illustrations presented here-with are fair representations of the mining operations carried on at the present time.

#### GENERAL MINING NOTES.

The car of machinery for the Young America which is expected in Bossburg, Wash., includes a large boiler and engine, compressor, machine drills, electric light plant, etc. Everything at the mine is awaiting the arrival of the car. The buildings and flume are about completed.

The Northern Light Gold Mining and Milling Company will make a shipment shortly of ore from the new strike in some of its properties on Lion Hill in the Ophir district portion of the Mercur region, five miles northwesterly from Mercur, Utah, and is expected to be something phenomenal as to value.

It is reported that the Sunshine properties at Sunshine, Utah, will bustle with activity in the near future, as the company proposes to resume operations.

The showing at the Valeo mine, at Park City, Utah, is all that could be desired. Thomas Kearns, the manager of the great Silver King mine, has been elected president and manager of the Valeo, and this is a guarantee that the property will be operated on a strictly businesslike basis.

#### The War Eagle.

On the War Eagle mine near the town of Rossland, B. C., the last raise in the big ore shoot between the 500 and 375 foot levels has been completed, as has also the raise to the west of the shaft in the ore body between the 375 and 250 foot levels.

The east raise opens the great ore shoot which was met some months ago. At the 275 foot level the shoot shows 10 feet of \$32 ore, while at the 500 foot level the same shoot is 32 feet wide, of which 12 ft. is \$35 ore, while the

rest is valued at \$10. The electrical machinery for the new gallows frame is being rapidly installed and the huge masonry foundations for the apparatus are nearly complete.

The Le Roi shipped 15,445 tons of ore during the month of October, and the cost of extraction, including the dead work, advanced development and hoisting of waste, was only \$2.47½ per ton.

A ten-years' lease has been completed of the nine-sixteenths interest of the Kleinschmidt Bros., of Helena, Montana, in the Peacock, Helena and White Monument mines Seven Devils country, Idaho. J. Glass is general manager of the company. They will prosecute development work, if necessary, until spring, when the tramway to carry the ore to the river will be built. The ore bins will be on the Snake river, which runs three miles from the mine, but which is at an elevation of three thousand feet less than the head of the tramway. The company will utilize the drag of the ore buckets down that 3000-foot incline for the development of power to run the sawmill and electric light plant at the mine. At Ox Bow the copper smelter will be located. The buildings in which the smelter at Cuprum is constructed will not be moved, but the machinery will be taken to Ox Bow, and with additional machinery and improvements will be used.

"It is not surprising that good strikes should be made at a depth of 600 feet in any Lower California, Mex., mine," said a gentleman of San Diego, Cal., familiar with mining properties not only on the peninsula, but in this country. "It has been demonstrated already that all mines in Lower California below the 300-foot level show up well, and the same can be said of mines on the desert, both in Lower California and in this country. I have never seen it fail. After the 300-foot level is passed the ore is invariably rich and permanent."

The Pan-American Mining Co., which bought some years ago the tailings dump deposited by the Prietas mill, in the southern portion of Sonora, Mexico, when worked in former years by the old original company, have worked out all their ground—using the cyanide process—and suspended operations. Mr. J. E. Beveridge, who was in charge of the work the past three years, has returned to his home in Salt Lake City, Utah. It is understood that the operations of the company have proved profitable.—Nogales Oasis.



THE LIVERPOOL HOISTING WORKS.



## CORRESPONDENCE

## CANADA.

## Canadian Gold Mines.

(From our Special Correspondent.)

There has been a new development in gold mining in what is called the Sharbot Lake district, near Ardoch in Clarendon, which promises very good returns, as the ore is very rich and comparatively free milling. On the surface, these ores contain a great deal of arsenical pyrites, but as they gain depth the arsenical ore seems to be replaced by iron pyrites, which carries some of the rarer bismuth mineral in small quantities. They have organized the Boerth Mining Company in Detroit to work these properties. They are working about fifty men on the development, and are building a patent process mill. They are sinking three shafts at the present time, and all of them are in rich ore, averaging about ninety dollars, although very little free gold is seen by the eye, and the amount of sulphurets contained in the ore is only about two per cent. It is probable that they are working on especially rich shoots, although the shafts are about a hundred feet apart. They have indications of a large vein and a great deal of ore opened up which will run from five to forty dollars, so that even if their patent process should prove a failure, the mine can be worked by the usual method and make a success.

Since this strike has been made several other companies are buying lands in the neighborhood.

This discovery is rather interesting on account of some of the veins in the neighborhood carrying a large percentage of bismuth. The veins occur as bedded veins in the mica-schist and also as gash or fissure veins cutting across the formation. It is rather early to predict what the future of these mines will be as the shaft is but thirty-six feet deep, but for the work done, the property makes a very fine showing, and will tend to revive the interest in this section, which has languished for some time, on account not only of the difficulty of treating the arsenical ores, but also because the properties of the Marmore district have found these arsenical ores do not carry a uniform tenure.

## UTAH.

(From our Special Correspondent.)

SALT LAKE CITY, Dec. 5, 1898.

DEAR SIR:—The Utah mining stock market continues active. I think the way seems clear for a prolongation of the present upward movement, and particularly for the taking up of a number of stocks which have been neglected in the present upward movement.

The Ajax stands steady at 65 cents, but there are no transactions in the Alice. There is no activity in the stock of the Alliance; the same can be said of Anchor, while Buckeye is on the increase. Bullion-Beck was the one weak spot on the list, and no favorable reports are coming in from the property. Centennial-Eureka stock is inactive, but will in all probability show an advance this week. Chloride Point is stronger, Dalton was active, Daly strong and in demand, Daly-West was not traded in, Dexter advanced strongly; Eagle, of Mercur, was strong and in demand, while the Eagle and Blue Bell stock advanced rapidly and closed at the highest point. Four Aces was a trifle weak, but I look for shares to go higher later on.

Galena slumped badly from no apparent

cause. Geyser-Marion was picked up quietly whenever offered; the stock advanced rapidly and sold at the highest point for months.

Grand Central simply soared; the last sale was \$8 and it may go higher. Horn Silver sold at \$1.20. Joe Bowers closed a trifle soft; the demand for the stock is coming from good sources, but the majority of holdings are in weak hands. Little Pittsburg was strong at last week's figures. Lower Monmouth was in high favor and very active.

Mercur advanced rapidly on limited sales; never in the history of the company have I known the supply of floating stock to be so limited. Northern Light continues to be the most active security on the list; the stock has a number of recessions, but on every advance touches a higher point; the insiders have been the most persistent buyers. Ontario is very strong, selling at \$7.25, and with but little stock offered.

Sacramento was steady and in demand. Sunshine was strong, but South Swansea a trifle weak. Utah was in favor, while Valeo was very weak, though no doubt will soon pick up a little.

## WISCONSIN.

## Recent Activity in Lake Superior Copper Mines.

(From our Special Correspondent.)

The recent unprecedented advance in the value of copper stock and copper properties on the south shore of Lake Superior seems to be on a steady increase. The renewed interest started from the discoveries made on the Baltic mine on ground that had not been considered of value in the early days. This property was financed by Mr. Cameron Currie, the well-known broker of Detroit, and Mr. S. L. Smith, one of the prominent capitalists. The stock was put on the market at five dollars to furnish a working capital, and although it now stands at twenty-six, it is said by those who have seen it to be far below its real value as compared with other stocks that are selling at a high rate, and whose success simply depends, so far, on the boom. The fact of the Baltic's success and that the Standard Oil people have taken up some of the copper properties has given a fictitious value to every piece of abandoned property in the Lake Superior region, and as copper can be found throughout a territory extending several hundred miles, there is no end to the opportunities for new copper companies, although much of this territory was thoroughly explored in the early sixties.

The old Minnesota mine, under the name of the Michigan, was financed in a small way by Mr. A. M. Lowe of Detroit, and they have spent some thirty thousand dollars in new developments under the superintendency of Mr. Samuel Brady, M. E. They are said to make a very fine showing, and it is whispered in Detroit that they will call on Mr. Cameron Currie, who at present is considered the most successful financier in such matters, to aid them in a more substantial reorganization. It is proposed to furnish a large working capital to sink below the old workings and develop the new ground. As this mine has an excellent record, and had only reached a depth of thirteen hundred feet, the possibilities of the ground are well worth any expenditure that may be made.

There are active inquiries for this stock and there is no doubt that it will rapidly increase in value when offered.

On the Canadian side there is also considerable development in copper properties, the

most important work on this side being done by Lord Douglas at the old Bruce mines. This property has been lying idle since the seventies, at which time they had a caving-in of one of the important shafts, when the company, through a good deal of mismanagement, was unable to recover itself. I think the general impression with regard to this property was that it was no good, having been worked out, but Lord Douglas has taken hold of the work of prospecting it very systematically, and has spent a large sum of money, said to be seventy-five thousand dollars, not only in opening up the old works, but proving up the lode at new points.

Anyone now examining the property would be surprised at the large amount of copper ore that has been developed. It has recently been reported on by Dr. Hatch of England, who makes a conservative but favorable report and recommends that it be developed on a large scale.

The stopes in this mine show from six to nine per cent of copper, while the average of everything in sight is a good working grade, even for a sulphuret ore. No doubt it would surprise most copper men, who have undoubtedly held the opinion that this was a worked-out mine, to see the large amount of ore developed and the great possibilities of the property, as it has hardly been touched yet, the deepest shaft not yet having reached four hundred feet, and there is a mile or more of good development on a large sized vein, or rather system of veins. The Lake Superior men are apt to neglect mines carrying sulphurets, and do not take into consideration that in this favorably located district, that the difference between sulphuret and native ore should not be over two per cent of copper in favor of the latter, yet mines containing eight or ten per cent of sulphuret ore are neglected at the present time.

At Rock Lake, about ten miles to the north of the Bruce mines, there is considerable development being made on a large vein of sulphuret ore, and the owners are putting up the necessary buildings preparatory to working the property on a large scale. They have opened up a seventeen-foot vein, some parts of which are very rich in good ore, and the great showing of iron on the surface of this property, which can be considered as the "iron hat" of the German miners, the great improvement in copper at the slight depth they have gained, as well as the experience of this region warrant the belief that when depth is attained, the percentage of copper will increase in these veins.

There is more or less development of copper along the north shore of Georgian Bay, but nothing as yet has established a reputation of being anything more than a small prospect, until one reaches the copper-nickel deposits of Sudbury district.

Should the excitement in copper continue, many of these properties will be more actively developed the coming summer.

WM. M. COURTIS.

Detroit, Michigan.

## Miscellaneous Mining News.

## ALASKA.

The Ebner is erecting a new 20-stamp mill in the gulch leading up to Silver Bow basin, and is about to start a tunnel from the level which will tap its ledge at great depth. Further up the same gulch the Alaska-Juneau Company has 30 stamps at work on the ore



from a great open quarry of slate full of veins of quartz carrying free gold. They simply quarry out the whole mass, sort out the quartz, send it to the mill and throw the slate over the dump.

## ARIZONA.

New machinery is being placed in the Vekol mine, as the electrical process did not work satisfactorily. The Vekol has already produced \$17,000,000 in silver, this having been mined by crude methods. The mine is yet but a prospect, so far as the ore body is concerned. It is one of the rich mines of the world.

The Congress mine has reached a depth of 1700 feet; Crowned King, 1000 feet; Planet-Saturn, 700 feet; Little Jessie, 500 feet; McCabe, 500 feet; Jersey Lily, 450 feet. Every gold mine in Yavapai county, with two exceptions, that is now working at a profit, has been developed and equipped by the wealth taken from the mine.

## CALIFORNIA.

### INYO COUNTY.

#### Ballarat Notes.

Superintendent Harrison is expected to resume operations on the Cleveland mine in a few days. As depth is attained the mine shows higher grade gold ore and width of vein increasing.

Mine owners in South Park district are in nearly every instance doing work on their claims and meeting with encouragement as their work progresses.

At Tuba and Goal canyons all the mines appear to improve as depth is attained.

Two important sales are now being negotiated, and if brought to a successful issue lively times may be looked for before spring.

At Mineral Hill, Richard Day, Superintendent of a group lately purchased, is meeting with success in his preliminary development work.

John A. Shaw, in charge of mining property purchased by Kern county parties, seems to be very sanguine as to the future of the property he is managing.

Taken as a whole, this section has every indication of becoming one of the most important gold-producing sections of the state.

### SAN BERNARDINO COUNTY.

The Grant Brothers, Michigan mining men who have secured control of the Rose mine, 50 miles from Victor, have sunk a new perpendicular shaft on the property, thereby avoiding the handling of the ore extracted from the lower workings so many times before reaching the surface. The cyanide tanks used in working the tailing of this mine last spring will be moved up the mountain to the new shaft house, and the low-grade ore will in future be worked by the cyanide process. The rich streak which accompanies the vein will probably be shipped.

### SAN DIEGO COUNTY.

Mesquite, on the Southern Pacific, was formerly a rich dry placer camp, but on account of recent discoveries of rich ore in fair quantity, the result of the last year's develop-

ments, has developed into another permanent desert mining camp, with six resident families and three saloons. This section requires a pumping plant and mills to make its ore bodies remunerative.

An exchange says: The mines at Venus camp, Picacho district, owned and operated by H. W. Blaisdell of Yuma, who has a fifty-ton cyanide plant at work extracting the yellow metal from the ores, are proving an unqualified success under Mr. Blaisdell's management and the superintendence of Mr. Frank Guerra—a success fully justified by the enterprise and good judgment displayed by the owner. The second monthly clean-up was made a few days ago, and the value of the bullion brought down was said to be \$35,000, while the expenses were about \$12,000. The previous month's run was \$29,000.

New life has been instilled in the Cuyamaca mountains. The huge pile of tailings of the great old Stonewall mine will be worked by cyanide, and no doubt a handsome clean-up can be expected. In the palmy days of this mine the operators did not think it economy to save the values as close as possible, believing that if a greater amount of ore could be put through the mill and not so high percentage of extraction obtained, more money could be made. As a natural consequence of this procedure, the tailings are rich and the present engineers, Robert, Strauss & Co., who are instituting these operations, expect a good return for the money invested.

## COLORADO.

The last payment was made November 15th of the \$50,000 debt of the Argentum-Juniata Co. at Aspen, Pitkin county, and the company starts anew with bright prospects before it.

The mine itself is said to now be in better condition than ever. The ore bodies are large and well developed, awaiting only the breaker to convert them into cash through the process of concentration. All of the ore is of good average value, and in addition it is stated that the mine has recently developed one fine body of high grade stuff, averaging between 300 and 400 ounces and being nine feet in width.

The remarkable success of the company in getting out of debt and on the high road to prosperity is attributed solely to the mill and its splendid work. It is doubtful if such satisfactory results could have been achieved without its aid. Its tailings help to make the Roaring Fork a muddy stream, but its product also helps to sustain the life and energy of the people of Aspen. If it were not for the A.-J. mill and the several others now handling the low grade ore of the camp (the only kind there is left in the mines) Aspen's place on the map of Colorado would not be the size of a pin point.

The working force at the Gregory-Bobtail, one of the Gilpin county producers, now numbers 75 to 100 men, and a large tonnage is being taken out. The incline is being extended so as to cut the Briggs shaft and this work is being prosecuted in four places, so as to hasten its completion. When the incline is down to the Briggs shaft it will do away with the extra hoisting of ore through the latter shaft, and one hoisting will do the work hereafter. A large duplex pump of the Knowles pattern, with a capacity of 700 gallons per minute, is being placed at the bottom of the Briggs shaft, a depth of 300 feet below the

900-foot level of the incline. Manager Collins says that he has a force of men at work both sinking and up-raising on the Bobtail, and some good results are sure to be obtained when the connections are made and the prospects of this property look brighter now than they have for quite a while.

### Record Year.

This has been a record year for Cripple Creek.

Every month has gone the previous one a point or two better in the matter of production.

In the matter of dividends this rule does not apply, but it can be safely said that in this connection every month has been far ahead of the best month in 1897.

November caps the record for dividends of any month in any period of Cripple Creek's history. The total is well over \$300,000—over \$30,000 better than the previous best, and is made up as follows:

Victor.....	\$100,000
Portland.....	69,000
Lillie.....	33,750
Strong.....	25,000
Appie Ellen.....	25,000
Elkton.....	20,000
Golden Cycle.....	15,000
Associated.....	11,000
Gold Coin.....	10,000
Modoc.....	10,000
Montreal.....	7,500
Eldorado Leasing.....	1,000

Total..... \$318,250

The previous next best month to this was in February last, when, owing to a dividend declared by the Orphan Bell company, out of part of the purchase price paid for the property, the total ran up to \$283,100. The November dividends are, however, all from earnings with the exception of the \$25,000 credited to the Appie Ellen Company and \$7,500 to the Montreal company, which is much more than offset by the \$92,000 of the Orphan Bell company in February.—*Colorado Springs Investor.*

## GEORGIA.

Dahlonega is undoubtedly the coming mining section of Georgia. But little is known of it in the western United States, and if reliable data could be obtained pertaining to the operations carried on, the number of men employed in and about the mines and surrounding country prospecting for minerals and developing prospects already discovered, it would cause no end of surprise to the miners of the west, some of whom did not even know there was such a place.

What is considered the largest gold mining deal ever made in the vicinity of Dahlonega, was consummated in the latter part of October, when the Hand & Barlow was secured by a new and wealthy syndicate, but the particulars have not as yet been made public. The Hand & Barlow property is possibly the largest and was formerly the most successful mining scheme in that section of the country.

## IDAHO.

J. N. Rice of Florence has brought suit for one-fourth of the original Buffalo Hump discovery on the basis that he held a grub-stake interest in any discovery or location made by Rigley during 1898, and claims that he holds receipted bills showing that he paid for the



outfit that was used at the time of the Buffalo Hump discovery. This is the property for which Capt. De La Mar offered \$500,000. The litigation will tie up the property for an indefinite period. Mr. Rice has bonded his interest to Spokane parties and a stock company is being organized there.

## MICHIGAN.

At Rockland, Ontonagon county, the equipping of the Michigan mine, under the able and conservative management of Supt. Samuel Brady, is proceeding in a very substantial manner, and it will be but a few days now when the new machinery being installed is enclosed.

The Brotherton mine, at Wakefield, Gogebic county, has been having a large amount of water to pump the last season, due to the stoppage of its near neighbor, the Sunday Lake, says *Iron Ore*. It costs 18 cents per ton of the ore hoisted to pay the water charges. Add to this a royalty, and consider the smallness of the ore deposits, and it will be seen that the company is kept busy securing a new dollar for an old one. The company expects to be active during the winter and looks to a division of its pumping charge by a resumption of mining operations at the Sunday Lake. The latter property has consolidated with the Iron Chief and will soon be busy again.

## MINNESOTA.

Mr. Joseph Sellwood, of Duluth, was in Ishpeming, Mich., last week, on his way home from Chicago. He says the Minnesota fields will contribute about six million tons of ore for the year soon to close. They would have done considerably better than this but for the scarcity of labor. Next season they expect to ship seven million tons.

The Chandler sent out 750,000 tons and has 150,000 tons left in stockpile. There were 250,000 tons carried over from last season. The Pioneer has finished pumping, and is just beginning to hoist ore. Work is also progressing at the Zenith.

## MISSOURI.

### Mines of Joplin.

Crane, Cooper & Co. have struck good jack at 96 feet in their new shaft in Leadville Hollow.

Since the first of May, the Newsboy, at Duenweg, has made and sold over \$100,000 worth of lead and zinc.

F. D. Bendruff has bought of Jap Vansil and Robert Jeffries one fourth interest in the Grubworm, for \$2,800.

The shaft of Brewer Bros. & McGehee, at Tuckahoe, has been sunk to 175 feet, and they are now cutting on a good face of jack.

A large-sized Star drill is at work prospecting a tract of land one and a half miles north of the Zenith plant in Newton county.

Meeker and Savage on the Pinkard, have put in a pump and other machinery in their new shaft and are ready for active work.

After drifting fifteen feet, the Vesuvius, on the White Oak, has struck a good run of lead, and their first turn in from three shifts was \$9,040.

John D. Gougar, of Lafayette, Indiana, has purchased a one-tenth interest in Houk & Co.'s tract.—*Joplin Herald*.

## MONTANA.

The deal for the sale of the Nancy Hanks mine, which was being engineered by Butte parties, is declared off. The Nancy Hanks mine is located at Garnet, and Sam J. Ritchie, its owner, is at present in Butte. The mine is said to be a phenomenal producer of high grade ore, nearly all of which is shipped to Butte. It is understood that W. A. Clark of Butte has had experts examining the property for some time and that an offer of \$250,000 for the mine has been refused by Mr. Ritchie, the terms not being satisfactory.

It is reported that the workmen at the property of the Conrey Placer Company at Sheridan, engaged in sinking a shaft to bedrock, have attained their object at a depth of 35 feet. When the miners had pierced the layer of cemented gravel which baffled the placer machines, it is said they encountered a wash different from any yet found in Alder gulch. The gold dust, which is more plentiful and coarser than that found above the cement bed, is also of a different quality. The bedrock encountered is of a soft, soapstone formation. This find beneath the cement opens up a new field for speculation on the wealth of the Ruby and the theory held by many that untold millions lie amid the sands resting on the bedrock of the valley. For ages the erosive powers of hundreds of streams and gulches have carried down the burden of their waters and deposited it in the valley below. From the head of the Ruby to its mouth, every gulch and stream and gully putting into it from the Tobacco Root and Gravelly ranges, that have been prospected, have shown the presence of gold. In some places it was in small quantities and would not justify the working. But, on the other hand, an Alder gulch, yielding millions in gold, was found.—*Helena Independent*.

## NEW MEXICO.

### Output of Hillsboro Mines.

Output of Hillsboro gold mines for the week ending Thursday, December 1, 1898, as reported for *The Advocate*:

	TONS
Wicks.....	35
K. K.....	30
Richmond.....	55
Snake Group.....	80
Opportunity.....	30
Sherman.....	5
Cincinnati.....	25
Tripp.....	85
Rex (silver-lead).....	15
Total.....	360

Total output since January 1, 1898—9,150.

## NEVADA.

### New Pass Mines Sold.

J. F. Mitchell, formerly superintendent of the Austin Mining Company, has purchased from Hon. T. J. Bell the Superior and Gold Belt mines, situated at New Pass, and has made the first payment to bind the bargain, says the *Reese River Reveille*. Mr. Mitchell has also made a payment on the group of mines belonging to Messrs. Ryan, Sutton, Murphy & Co. The second payment to be made in 60 days.

The mines purchased are gold bearing and

the ledges very large and the ore free milling, with enough in sight to keep a large mill running for many years, and we predict that there will be 150 miners at work in the New Pass mines within the next 18 months.

## OREGON.

The miners at work in the Collateral mine in the Virtue district have struck an ore body, and from all appearances the vein is the Collateral ledge, and this with other prospects in sight warrant the statement that the Virtue Consolidated Mines Company will soon be able to start their mill on a steady run of good ore.

Rich ore was taken from a stringer of ore in the Carroll B. mine, in Mabel district, 12 miles southwest of Baker City, at a depth of 50 feet from the surface, says the *Baker City Democrat*. The ledge at this point is 2½ feet wide with the rich pay streak running through it.

The Carroll B. is in close proximity to the Mabel mine, from which upwards of \$20,000 were taken from a shaft not more than ten feet in depth by Mr. Baisley a few years ago.

## SOUTH DAKOTA.

### Phonolite Ore Discovered.

O. U. Pryce, recently of Cripple Creek, Colo., and well known in the Black Hills, made the startling fact known this week that he had discovered a large area of country, up in Deadwood Gulch, about four miles from Deadwood, in which there is to be found a large amount of phonolite rock. There are a great many prominent cliffs and dikes in the district, which have always been considered by mining experts to be porphyry. Mr. Price is familiar with the Cripple Creek country and knows phonolite when he sees it. He spent two or three weeks up in the district in Deadwood Gulch, making careful examination of the formations and making assays for values from the different shoots of ore which he found.—*Black Hills Mining Review*.

## UTAH.

The Sacramento Company of Mercur paid its regular dividend, \$5000, on the 1st of December. The mine is looking well.

The Swansea Mining Company of Silver City, in the Tintic district, it is declared, will pay a double dividend on the 15th of this month.

The latter part of this month it is expected that the Daisy Mining Company of Mercur will pay its initial dividend. The mine is said to be in splendid condition.

The last shipment of ore from the Ajax mine at Mammoth was one of 100 tons, being a very high grade copper ore. The developments at the mine are being kept well in advance.

## WASHINGTON.

The Republic Mining Company last week declared its regular monthly dividend of \$30,000, payable December 10th, says the *Spokane Miner and Electrician*. This is the third dividend, one each in the past three months, and with the increased plant now



being installed it is quite probable the returns to the fortunate stockholders will be greatly increased.

A rich strike is reported on the Golden Harvest, in Republic camp, the long tunnel showing a full face of ore averaging from \$30 to \$40. The tunnel is now in over 400 feet, and has been driven all the way on the ledge, finally reaching the looked for ore chute, with splendid results. The claim is owned by James Harvey, superintendent of the Republic, and others.

## FOREIGN MINING NEWS

### BRITISH COLUMBIA.

Extracts from B. C. Mining Critic.

#### SLOCAN.

The Dundee mine, near Ymir, recently made a test shipment of 20 tons to the Hall mines smelter, which gave returns of over \$50 per ton, an increase in value of 40 per cent. over the last shipment. The ore came from the 150 foot level.

#### KAMLOOPS.

Since bornite was struck in the crosscut at the 160 foot level in the Pothook, men have been working night and day, and are not yet through the ore, which continues to improve. They have now gone 19 feet in the ore and have drifted 14 feet along the vein. This strike has encouraged many claim owners to go ahead with work on their claims, and a large amount of assessment and development work is now being done on the hill.

### LOWER CALIFORNIA.

The steamer S. Denis brings news of a very rich strike in the mines of the Ybarra Gold Mines Company at Calmalli, 300 miles south of San Diego, in Lower California. The rich ore was encountered at a depth of 600 feet and caused considerable excitement in a camp where rich strikes have been common for the past ten years. The owners of the mines, who are almost without exception San Francisco men, have ordered additional machinery from that city, and the schooner Anita is now loading there for the mines.

### MEXICO.

At Pilares, in eastern Sonora, the Le Roy Mining Co., of which Mr. McKim is general manager, is operating its property on an extensive scale and there is sufficient ore now in sight to work on for the next five years. The company has 500 tons of high grade ore running from 600 to 3,000 ounces, already sacked and ready for shipment, and considerable delay is being experienced on account of the scarcity of packers.

The queen of the mines at Pilares, however, are those owned by Col. Francisco H. Garcia, chief of staff for President Diaz. His property consists of 1,800 pertenencias, equal to 4,500 acres, of which thirty pertenencias are leased to Messrs. King and Newman of El Paso. These latter gentlemen are working on about fifty different places on their leased ground, and are taking out and sacking two tons of fabulously rich ore every day. The ore running less than 600 ounces is put on the dump, where there are 100 tons of it awaiting transportation.

### THE BURIED RIVERS OF CALIFORNIA AS A SOURCE OF GOLD.

[By J. R. Scupham, San Francisco, Cal.]

(Continued from our Issue of December 1st.)

Through geological ages, the processes of nature seem to have tended towards a gradual concentration of metals. Chiefly is this the case with gold. First, we find it disseminated in infinitesimal quantities in all the waters of the ocean. By precipitation, slate-rock is formed under the bed of the sea, and the gold from the ocean waters is concentrated in the slate rock. The slate subsequently upheaved in continental masses and fissured in the upheaval. The fissures become the waterways through which flow thermal waters from the lower depths of the earth. These waters leach out the silica and the gold from the enclosing slates and deposit them in the form of quartz veins which fill these fissures. When the valleys are deeply capped with the volcanic flow, these same thermal waters may find their way into the ancient channels and meeting there with organic materials, which forms the condition favorable for the deposition of their metallic charge, they would begin and continue the formation of nuggets about some metallic nucleus, and thus in the course of hundreds of thousands of years during which these conditions have existed, this deposition of gold has been going on in these ancient channels. The deposition of gold in this manner by the successive plating of nuggets, as is proved by experiments, requires the presence of organic material. Such was always to be found in the channels where bedrock gravel existed and was chiefly in the form of wood, leaves or vegetable loam. Although we also find buried in the volcanic material other channels filled entirely with lava gravel, i. e., rounded water-worn pebbles of volcanic material, yet these channels are entirely barren of gold, as they were necessarily barren of organic material. The same water that contributed to the accretions of gold in the channels carrying bedrock gravel, would flow through these channels of lava gravel and would there make no deposition of their metallic contents.

This method of the accretion of gold nuggets in place has been pointed out by Mr. Daintree of the Victorian Geological Survey, also by Chas. Wilkinson, by Prof. Newberry and Mr. J. C. F. Johnson in his work on "Getting Gold," published in London this year, and indeed no one can make a careful examination of the gold nuggets taken from these ancient river channels without being compelled to believe that this is the mode of their formation. Some of these nuggets show beautiful and delicate filigree work, which could not have existed on them at all if they had been moved by the water a single foot through a sand or gravelly bed. I have myself lately seen nuggets weighing from half an ounce to more than an ounce taken from the "Specimen Mine," in Byrde Ravine near Michigan Bluff, composed entirely of a plating of scales, each one of which was nearly a perfect crystal of gold, and which could have been formed in no other way but by the slow electro-plating process of nature. But, this theory of the origin of the gold nuggets has been fully argued and proven too, I think, in the treatise by Mr. Johnson which I have before mentioned. It seems perfectly evident to me from my personal observations, and I will not go into the argument here. I will only say that this theory explains satisfactorily how it is that all the channels containing bedrock gravel, which

are buried deep enough in the volcanic material should be auriferous. For the benefit of the miners, I will give the following instances, showing from practical experiences the gold obtained from drift mining on these channels.

In the case of the Bald Mountain Drift mine, situated in Sierra county, California, the ground was purchased at a cost of \$20,000. About the same amount was spent, running a tunnel into the ridge to strike the channel. The channel was found to be about 300 feet in width with from 4 to 6 feet in depth of pay gravel. The company worked the channel by drifting, that is, by mining out the gravel and washing it at the mouth of the tunnel, and in this way cleaned up the channel for a length of 4,200 feet. The gravel so mined yielded \$2,581,740, and enabled them to distribute in dividends \$1,003,000. (See 9th Report California State Mineralogist, page 121.)

At Ayer's claim, near Michigan Bluff, a portion of the bedrock of the channel, 100 feet in length by about 35 feet in width, yielded \$30,000. Mr. Perkins, the agent for Wells-Fargo's Express Co. at Michigan Bluff, in 1871, reported that the shipment of gold mined from the ancient channel in that vicinity, in five years had amounted to \$7,500,000.

In the ancient channel opened under Table Mountain, in Tuolumne county, a portion of the gravel yielded at the rate of \$3,000 per square yard of bedrock cleaned. All these are examples of the richer gravel found in these ancient channels. None of the channels carrying bedrock gravel are ever found to be entirely barren, but the gravel in some of the larger channels carries very much less gold than the above examples, yet, even these are worked to advantage.

In the Hidden Treasure mine, which is operating through a tunnel more than 3,000 feet in length, there is a breast of uncemented gravel, 5 to 6 feet in height; from 800 to 1,100 feet across the channel, this gravel is extracted at a total cost of 71 cents per ton carload, and though the gravel yields only about \$2 per car load, the property has been paying handsome dividends for many years. In many cases, material composing the pay gravel has been cemented together by the action of the thermal waters and powder has to be used in the breasts. It is necessary, also, to pass all the material through a stamp mill in order to extract the gold. Yet, even in this case, gravel yielding less than \$4 per cubic yard is worked at a profit. There are special stamp mills for the purpose of crushing cement gravel, having extra wide mortars and discharging through screens quarter-inch apertures. These are capable of crushing from 5 to 10 tons to the stamp head, varying according to the character of the gravel. In some instances, by the erosion of the ridge in which the ancient channel is enclosed, the gravel in place is exposed on the slope of the ridge, or, as miners term it, "the channel breaks out" at such a point. It was in this way that these channels were first discovered. When this occurs, it is easy following the channel in under the lava cap with drift tunnels. This constitutes the simplest kind of mining, as there is practically no dead work to be done. But, as the lava capping is usually from 400 to 1,000 feet in depth, it is generally necessary to pierce the ridge with long tunnels in order to reach the buried channels. These tunnels are sometimes from 2,000 to 6,000 feet in length and cost from \$8 to \$15 per foot. When a mistake is made in the elevation, and the tunnel



strikes the channel too high, it is generally useless, as there is so much water to handle in the old channels that gravel cannot be profitably extracted through a winze sunk at the end of a long tunnel. In a case like this, there is nothing to do but to find the right elevation and run another tunnel. The money expended in running the tunnel is wasted. Often, however, the companies have exhausted their resources before they are able to correct such mistakes.

Some of the channels are being profitably worked through vertical shafts sunk from 400 to 600 feet down through the lava cap. In this case, all the water, as well as the gravel, must be raised to the surface, and only the richer class of gravels yield good results when mined in this manner. In spite of all the work that has been going on, only a comparatively small proportion of the total length of the buried channels has been worked. In the more favored localities, like that of the Forest Hill Divide, the channel has been worked at different points a few miles apart, and the grade and the elevation of the ancient channels thoroughly determined. This circumstance makes claims on this ridge much more valuable than they would be at other points, for the reason that working tunnels can be located with certainty, and there should be no danger of blank failures resulting when they are extended far enough to strike the channels. At present a good deal of attention is being given to this kind of mining in California, and some new enterprises are being started up.

## PERSONAL NEWS ITEMS

P. BAILEY EASTWOOD, the Transvaal, South Africa, mine owner, has been stopping in San Francisco, Cal., the last few weeks.

W. H. CORBOULD, general manager of the Canadian Exploration Company, who has been at the company's headquarters in London for a year, and who recently returned to Rossland, and the Porto Rico mine at Ymir, has gone to Colorado, New Mexico and points in the southwest on an extended trip.

MANAGER GRUBBS of the Banco Minero, at Parral, says he expects to ship a million dollars worth of silver bullion from Parral the coming year. The Hidalgo Mining Company, which heretofore has been shipping from three to four hundred thousand dollars' worth, alone, is doubling its capacity, and other companies are largely increasing their output.

J. K. HAWK, secretary of the Colorado & California Mineral Development Company, has just left for the mines of the company located in San Bernardino county, Cal. Mr. HAWK will do the necessary assessment work remaining due and having taken CHAS. E. WALKER, an ex-mineral surveyor of Colorado, along, will run the lines of the property.

W. W. ALLEN, general manager of the Pueblo Smelting and Refining Co. of Pueblo, Colorado, was in Los Angeles, Cal., last week.

JOHN Q. MAGDONALD, former general manager of the Beneficiadora del Concheno, at Concheno, Chihuahua, Mexico, is now employed at the Rose mine, fifty miles east of Victor, in San Bernardino county, California.

R. H. LACY, secretary of the Lacy Manufacturing Co., office Room 2, Baker Block, Los Angeles, Cal., says business in his line is picking up wonderfully in the last few months. Cyanide tanks for the mines of Southern California and Arizona is an important item of the business handled by this house and no doubt there will be much of this class of work turned out in 1899.

MRS. MCCONNELL of Los Angeles, Cal., received a sack full of gold nuggets from her husband at Dawson, N. W. Territory. One of them was valued at \$50.00.

W. HOYTENIA, a mining expert and capitalist of San Francisco, has been examining mining properties in the Cleveland district, Lander county, Nevada.

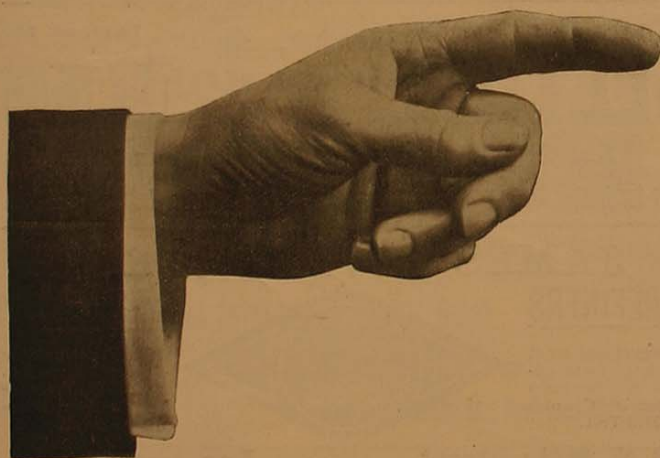
WADE & WADE, assayers and chemists of Los Angeles, Cal., are now preparing for the general mining public and those interested in metallurgical subjects, a book entitled *A Compendium of Gold Metallurgy*, giving an outline and much of the details of the various metallurgical operations employed in working ores. As an appendix it will contain considerable information on the subjects of assaying, prospecting and weights and measures, also various tests by amalgamation useful to a prospector in the field. This little treatise will be ready in about two or three weeks.

JESSE J. MACDONALD, representing the Gold and Silver Extraction Co. of America, Ltd., controlling the MacArthur-Forrest Cyanide patents for the United States, after looking Southern California over thoroughly, says, "I am surprised at the magnitude already attained in the use of cyanide in that particular section of the country; it seems to have supplied a long-felt want, and I am here to investigate, promote, protect, advise and in a general way assist all who wish to use or experiment with our process in the treatment of their ores." Mr. MACDONALD is a cyanide expert both practically and theoretically, having been in the field for the past seven years, erecting and starting plants in all parts of the United States. He has decided to make Los Angeles, Cal., headquarters for some time.

### CALIFORNIA MINING LOCATION NOTICES.

BELL'S CALIFORNIA MINING LOCATION NOTICES conform to the mining laws of California and the United States. Mailed for fifty cents per dozen.

J. BELL, PUBLISHER,  
Los Angeles, Cal.



## CLING-SURFACE

is a belt dressing, but so much more that

we will send you a sample can and guarantee that the belts shall stop slipping; the power shall be permanently increased; the belts can be run slack, and the leather shall become as soft as calf skin, also absolutely water proof.

We will further agree that the increased power (in a fair sized plant) shall earn the cost of the sample can EVERY MONTH.

This applies to Leather, Rubber, Cotton and Rope, also OILY DYNAMO BELTS.

**CLING-SURFACE MFG. Co., 167-172 Virginia St., BUFFALO, N. Y.**

Represented in Salt Lake City by THE UTAH RUBBER & MFG. CO.

## A Practical Test ...

We asked a man the other day what he thought of our pumps.

"Well," said he, "I've used this pump for twenty years, and it's better than most pumps yet."

The best material, workmanship and patented construction—that's why our pumps wear.

Are you going to buy—Write us for full information and catalogue. All free for the asking.

**W. T. GARRATT & CO.,**  
Pump, Bell, Brass and Machine Works,  
138-142 Fremont St., San Francisco, Cal.

## MINERALS WANTED



Gold and Silver Quartz Specimens, Crystals, Opals, Turquoise, etc., etc.

Buy in Any Quantities—Pay good prices—Cash

E. C. MOLLER,

538 EAST 86th STREET,

NEW YORK



## The Pulsometer Steam Pump

"THE MINER'S FRIEND"

Often Imitated—Never Equaled

Over 20,000 In Use

RECENT IMPORTANT IMPROVEMENTS

The Handiest, Simplest and Most Efficient Steam Pump for General Mining, Quarrying, Railroad, Irrigation, Drainage, Coal Washing, Tank-Filling and for Pumping back liquids heavily impregnated with sediment. Muddy or gritty liquids handled without injury to the Pump.

AGENTS

PARK & LACY Co., A. M. HOLTER HDW. Co., MITCHELL-LEWIS & STAVEL CO.  
San Francisco, Cal. Helena, Mont. Portland, Oregon.

CATALOGUE ON APPLICATION  
CORRESPONDENCE SOLICITED

**Pulsometer Steam Pump Co.**

133 Greenwich Street, New York City







## CHLORIDE OF LIME.

English prime brands \$1.60@\$1.70, American, \$1.70@\$1.80; Continental F., \$1.50@\$1.60 per 100 lbs.

## Acids.

Demands are good while stocks in maker's hands are comparatively small. Blue vitriol is scarce, and up to \$3.87½ is asked for the best grades, while ordinary kinds are hardly being offered. Imports included 95 bbls. and 30 casks oxalic.

Quotations are per 100 lb from New York and vicinity as follows: Acetic acid, commercial, No. 8, \$1.40@\$1.50; muriatic acid, 18°, \$1.10@\$1.75; 20°, \$1.20@\$1.87½; 22°, \$1.35@\$2.25; according to quantity and brand. Nitric acid 36°, \$3.50@\$4.75; 38°, \$3.75@\$4.62½; 40°, \$4.00@\$4.87½; 42°, \$4.62½@\$5.25. Oxalic acid, \$6.50@\$6.75. Mixed acids, according to mixture. Sulphuric acid, 66°, \$1.10 for drums and \$1.15@\$1.75 for carboys. Chamber acid 50°, in jobbing way, \$11.50@\$12 per ton f. o. b. factory. Blue vitriol \$3.50@\$3.62½ for extra grades and \$3.37½ for ordinary.

## BRIMSTONE.

Spot brimstone is very scarce, and small buyers are obliged to pay as high as \$24 and \$25 per ton for best unmixed seconds, and about \$1 less for thirds. Large buyers are however favored with much lower prices, and quotations by importers are \$22.50 and \$23 per ton for best unmixed seconds on spot, and \$21 and \$21.75 for futures; thirds are \$19.50 to \$20 to arrive.

## NITRATE OF SODA.

Buyers and sellers of nitrate of soda are still to far apart to come to any large sales, though about 5,000 bags were sold recently at \$1.52½ per 100 lbs. Sellers are quoting up to \$1.55 for spot, and for futures extending through December, 1899, \$1.55 to \$1.57½ per 100 lbs.

## FINANCIAL NOTES.

## Average Prices of Metals

In New York per pound from January 1, 1898:

Month	Copper	Tin	Lead	Spelter
January.....	13.87	3.55	3.95	3.95
February.....	13.29	3.71	4.04	4.04
March.....	11.95	3.72	4.25	4.25
April.....	12.14	3.63	4.26	4.26
May.....	12.00	3.64	4.27	4.27
June.....	11.89	3.52	4.77	4.77
July.....	11.63	3.50	4.95	4.95
August.....	11.89	3.23	4.00	4.58
September.....	12.39	3.99	4.67	4.67
October.....	12.41	3.78	4.98	4.98
November.....	12.85	3.70	5.29	5.29
December.....				

## Average Monthly Prices of Silver.

In New York per ounce Troy, from January 1st, 1898, and for the years 1897 and 1896:

Month	1898	1897	1896
January.....	66.77	64.79	67.13
February.....	56.07	64.67	67.67
March.....	54.90	63.06	68.40
April.....	56.02	61.85	67.92
May.....	56.98	60.42	67.78
June.....	58.61	60.10	68.09
July.....	59.06	59.61	68.75
August.....	59.54	54.19	67.34
September.....	60.68	55.24	65.68
October.....	60.42	57.57	66.05
November.....	60.60	57.91	64.93
December.....		58.01	65.24
Year.....	59.79	67.73	

The statement of the United States Treasury, on Thursday, Nov. 10, shows balances in excess of outstanding certificates as below, comparison being made with the statement for the corresponding date last week:

	Dec. 1.	Changes.
Gold.....	\$241,663,443	I. \$ 698,855
Silver.....	6,731,441	D. 639,848
Legal Tenders.....	14,754,979	D. 944,147
Treasury Notes, etc.....	1,411,799	I. 428,682

Totals.....\$264,563,653 D. \$457,058  
Treasury deposits with national banks amounted to \$94,641,001, a decrease of \$823,748 during this week.

Gold and Silver Exports and Imports.  
At all United States ports, September 1898, and year from January 1st, 1898 and 1897:

	OCTOBER, 1897	1898
Gold—		
Exports.....	\$13,311	\$1,279,926
Imports.....	11,775,483	16,227,358
Excess.....	L\$11,462,172	I 14,947,432
Silver—		
Exports.....	\$5,225,437	\$4,573,827
Imports.....	3,293,433	9,533,797
Excess.....	E. \$ 1,942,014	E. \$1,960,030

	TEN MONTHS, 1897	1898
Gold—		
Exports.....	\$32,989,892	\$14,061,849
Imports.....	28,386,318	143,658,095
Excess.....	E. \$4,612,574	I. \$129,596,246
Silver—		
Exports.....	\$ 47,832,111	\$34,946,377
Imports.....	17,164,680	24,974,164
Excess.....	E. \$ 30,667,431	E. \$10,222,163

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

## \* WANTS \*

Advertisements of this class containing not more than five lines will be inserted for not exceeding three months in any year, free of charge, to all paid-up annual subscribers. Other than above \$1.00 per month. Advertisements not accepted for less than one month.

WANTED POSITION OF Assayer with Mining Company. Have had experience in Milling and Cyanide works besides technical chemical training. References given. Refractory ores treated by Bromo-Cyanide method. Address, Tye JOURNAL Office.

WANTED, by a young man, a position as Assayer, etc.; experienced, competent and has a good knowledge of all metallurgical operations. Good references. Address, T. K. JOURNAL OFFICE.

EXPERIENCED Assayer and Cyanide operator desires engagement. The successful and economical treatment of silty ore or tailings by cyanide a specialty. Address W. V. WATSON, Rly. White Pine Co., Nev.

AN EDUCATED Chemist and Millman, thoroughly understands Milling, Chlorination and Cyanide Processes. Twelve years experience in Montana and Colorado, now open to an engagement. Moderate salary. Address: "Chemist" JOURNAL OFFICE.

MINING MAN of experience will develop Gold property of merit for ¼ interest, or will bond whole mine and develop. Correspondence with owners only. Give full particulars. Will give satisfactory references. Address P. O. Box 887, Los Angeles, Cal.

## FOR SALE!

4-STAMP, 650 lbs, with plates, feeders, etc., on cars free, \$400, condition guaranteed; Engine and boiler, new, \$250; also 2-stamp Llewellyn Mill; 2-stamp Fulton Engine Works; and 10-stamp Mill with concentration and power cheap; condition guaranteed; also 4-stamp mill complete; PARSONS & HAWKINS, 247 Wilcox Bldg., Los Angeles

A COMPLETE 20-stamp mill and equipment including assay office outfit, see ad page 24. Address: BOX 234, LORDSBURG, N. M.

WELL DEVELOPED Quicksilver property located in Western Texas. Has produced 4000 pounds of quicksilver. Address LOUIS LINDBERGH & Co., Del Rio, Texas.

I HAVE some good gold mining properties for sale at reasonable prices, some developed and some real good properties at Ward, Eldora, Gold Hill, Jamestown, Magnolia, Caribon and Sugar Loaf. Write stating what you want or call on me. JAMES M. NORTH, Former County Judge, BOULDER, COLO.

ANTIMONY BISMUTH PROSPECTORS having locations of this nature and wishing to sell at once for cash, will do well to address with full particulars, P. O. Box 2075, SAN FRANCISCO, CAL.

A VERY valuable, extensive Lead Mining Property in Southwest Virginia. Shafts sunk over 200 feet and actual work has demonstrated richness of veins and purity of ore. Address: GEORGE FRANKIE, Baltimore, Md.

## OPPORTUNITY.

GOLD, COPPER AND IRON MINING is profitable and respectable when you have the pay ores to mine. Because of owning more than we can properly manage, we propose to lease one or more valuable mines on equitable terms. Call or write VAN ANDA COPPER & GOLD COMPANY, Inns of Court Building, Vancouver, B. C. Van Anda City, Texada Island, B. C. 65 Wall Street, New York City.

## THE NATIONAL IRON WORKS



Riveted Boilers, Tanks, and Sheet Steel or Iron Work of every description.

National Steel Ore Car MANUFACTURER OF THE Repairing of All kinds Promptly Attended to. PORTLAND, OREGON

## Dividend Paying and Investment Mining Stock

W. E. HUBBARD & CO.,

Tel. 505 15 W. 2d South St., Salt Lake City, Utah

## FULTON ENGINE WORKS

Mining, Milling & Smelting Machinery

Estimates Furnished on all Classes of Mining Work

P. O. Box 296, STATION "C" LOS ANGELES, CALIFORNIA

## Bullock's Diamond Prospecting Core Drills

These are the only Machines which will give absolutely accurate records of borings. Fifteen styles and sizes. Operated by hand, horse, steam, air or electricity.

## Monarch Rock Drills

Any style of mounting. Simple, compact, economical. Operated by air or steam Hoisting and Haulage Machinery to fill any requirements.

## M. C. BULLOCK MFC. CO.,

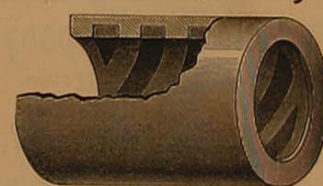
1169 West Lake Street, CHICAGO, ILLINOIS

## Chas. P. Grimwood,

Mining Engineer AND Metallurgist

Laboratory, 214 Pine Street, SAN FRANCISCO, CAL.

## Oilless Bearings,



For

Rope Tramways, HOISTING Engines, Tackle Blocks, Cam Shafts in STAMP MILLS. A Practical BEARING that RUNS WITHOUT OIL

The Graphite Lubricating Company BOUND BROOK, N.J.

## ADOLF FRESE

## ENGINEERING INSTRUMENTS

Barometers, Thermometers, Field Glasses, Microscopes and Accessories. Repairing Promptly Done. 126 S. Spring St., LOS ANGELES, CAL.

## A. F. JUDSON, E.M.

Geologist and Mining Engineer,

Mines Examined and Reported on. COLTON, CALIFORNIA

## A. A. WARREN

ASSAYER AND ANALYTICAL CHEMIST

COLTON, CALIFORNIA

## FOR SALE.

One Hall's Patent Excavator 450 Spread, including Boiler and Lidgerwood Engines, (Double) 8"x8" Cylinder. One 60 H. P. Locomotive Boiler and all necessary fittings. One 60 H. P. Erie Engine and all necessary fittings. One 50 H. P. Heater and Pump, (Boiler Feed), One No. 8 Sand Pump, Hose and all connections. One Copper Plate which is silver plated, 48"x60" and a lot of Piping, Scales, etc. Plant now set up in place in New Mexico. Will sell for ½ original cost and guarantee to be in good order. If interested, correspond with

The S. S. Machinery Co., Denver, Colo.

WM. T. SMITH 23 Years Experience E. A. ANDERSON

## WM. T. SMITH &amp; CO.

ESTABLISHED PROVIDENCE, R. I., 1854 LOS ANGELES, CAL., 1895



Refiners and Assayers,

Bullion Buyers, Mining Experts, Constructing Engineers REFERENCE, CALIFORNIA BANK

114 N. Main Street, Tel. Brown 1735 Los Angeles, Cal.



## MINING STOCK QUOTATIONS

BOSTON	
Aetna Con.	Gold Coin 10 00
Allouez	3 59 Humboldt 4 50
Anacoda	22 00 Illinois Steel 71 75
Arcadian	2 75 Lake Sup Iron 6 25
Arnold	2 50 National 6 25
Ash Bed.	2 50 New Idria Mfg 28 25
Atlantic	26 50 Old Dominion 55 00
Baltic	15 50 Osceola 23 50
Bonanza	12 12 Parrott 5 25
Boston & Mont.	22 12 Pioneer 119 00
Breece	1 50 Quincy 5 00
Butte & Boston	23 00 San Ysaac 173 00
Calumet & Hecla	585 00 Tamarack 3 00
Catalpa	18 38 Tecumseh 8 00
Centennial	25 00 Victor 8 00
Domination Coal	112 50 Washington Mng 28 00
Domination Pref.	112 50 Wolverine 28 00
Franklin	14 00

NEW YORK	
Alamo	03 Homestake 28 50
Alice	40 Iron Silver 30
Annetta	45 Mexican 30
Best & Belcher	59 Mollie Gibson 19
Bran swick	60 Ontario 4 50
Bulwer	65 Ophir 10
Crown Point	65 Plymouth 10
Con. Cal. & Va.	08 Quicksilver 3 00
Cripple Creek Con	08 Quicksilver pfd 11 00
Deadwood	11 25 Sierra Nevada 1 60
Favorite	04 Standard 1 60
Fortuna	04 Standard 1 60
Golden Fleece	45 Union Con 1 60
Gould & Curry	45 Yellow Jacket 1 60
Hale & Norcross	45

SAN FRANCISCO	
Alta Con	12 Mexican 15
Andes	13 Occidental 52
Belcher	21 Ophir 50
Best & Belcher	16 Overman 07
Bullion	10 Ontario 3 50
Caledonia	52 Plymouth 03
Challenge	13 Potosi 23
Chollar	45 Quicksilver 1 25
Confidence	45 Quicksilver pfd 4 00
Con. Cal. & Va.	33 Savage 19
Crown Point	10 Seg. Belcher 63
Deadwood	45 Sierra Nevada 04
Gould & Curry	18 Silver Hill 1 75
Hale & Norcross	55 Standard 1 75
Homestake	50 Union Con 18
Iron Silver	55 Utah 08
Justice	08 Yellow Jacket 15

## COLORADO SPRINGS STOCKS

Acacia	02% Isabella 23
Alamo	02% Jack Pot 07%
American Con.	01% Little 02%
Anacoda	37 Kimberly 01%
Argentum Junia	20% Magnet Rock 29%
Banner	Matosa 01%
Bob Lee	001% Mineral Rock 01%
Creede & C. Co.	04 Mountain Beauty 19%
Dan	04 Mollie Gibson 97
Des Moines	01% Moon Anchor 12
Elkton Con.	98% Mount Rosa 02%
El Paso	07% New Haven 00%
Emma Almee	003 Oriole 00%
Fanny R.	21 Orphan Bell 01%
Favor	02% Peoples 01%
Findley	05% Pharmacist 03%
Fl'wer of the W'it	005 Pilgrim C. 1 18
Franklin	003 Portland 01%
Golden Crater	22 Rattler 01%
Golden Fleece	01% Specimen 02%
Gold & Globe	55 Theresa 06
Gold King	03 Trachyte 02
Gould	01 Union Gold 15%
Granite Hill	004 Work 05%
Hayden	04%
Ingham Con.	04%

## SALT LAKE CITY

Alice	75 Little Pittsburg 03%
Ajax	68 Malvern 2 10
Anchor	60 Mammoth 6 07%
Buckeye	02 Mercu 5 50
Bullion Beck	5 50 Morgan 08%
Cent. Eureka	29 00 Northern Light 08%
Chloride Point	52 Omaha 5 25
Daisy	60 Ontario 1 65
Dalton	00% Overland 04%
Dalton & Lark	04 Richmond Ana 04%
Daly	1 00 Roder 59
Daly West	4 00 Silver King 29 50
Dexter	2 85 Sioux Con 05%
Eagle	07% Sunbeam 45
Eagle & Blue Bell	1 00 Sunshine 2 85
Four Aces	29 So. Swansea 1 23
Galena	44 So. Swansea 84%
Gemini	84 Utah 58
Geyer-Marion	84 Utah 58
Grand Central	6 07% Valco 58
Homestake	1 15 Young America 50
Horn Silver	1 15

## ROSSLAND, BRITISH COLUMBIA.

Alecta	10 Jumbo 37
Big Three	10 Knight Templar 05
Butte	01% Kootenay-London 10
Caledonia Con.	05 Le Roi 19%
California	15 Lilly May 05
Camp Bird	05 Mabel 08
Catic Queen	05 Mayflower 14
Centre Star	05 Monita 34
Colonna	32 Monte Christo 08
Commander	10 Morning Star 05
Deer Park	18% Mugwump 03
Della Colla	02 Nest Egg 03
Delaware	12 Northern Belle 04%
Eastern Star	20 Novelty 03%
Roterprise	18 O. K. 10
Edic	03% Palo Alto 02
Eureka Con.	08% Phoenix 13%
Evening Star	05% Poorman 15
Georgia	12% R. E. Lee 06
Gertrude	08 Red Eagle 03
Golden Drip	15 Red Mount View 03
Good Hope	02% Red Point 05
Grand Prize	02% Rosal'd H'mest'ke 21
Great Western	08% Rosal'd, Red Mt. 21
Hattie Brown	03 St. Elmo 05
Helen	04 St. Paul 12%
High Ore	04 Silver Bell 02%
Imperial	10 Silverine 20
Iron Horse	07 So. Cross & W. Con 02
Iron Mask	1 00 Virginia 1 02
I. X. L.	10 War Eagle Con 2 75
Josie Mac	30 West Le Roi 28
Josie	30 White Bear 09

## DENVER STOCK REPORT.

Aetna	001 Keystone 04%
Anchoria Leland	67 Lillie 99
Anacoda	37 Matosa 22%
Arcadia	01% Mollie Gibson 20
Argentum Junia	20 Moon Anchor 87%
Banner	01 Mt. Rosa 12
Bob Lee	01 Old Gold 12
Elkton	98% Peoples 01
El Paso G	07% Pilgrim C. 02
Enterprise	04% Pine Creek 003
Fanny R.	21 Portland 1 18
Garfield Grouse	01 Prince Albert 01%
Geo. Washington	002 Republic 02%
Golden Eagle	23 Sacramento 02%
Gold Coin	96 Smuggler 24
Gilpin & C. Co.	04% Specimen 03%
Gilpin Four	004% Tamarack 00%
Golden Fleece	22 Union Gold 13%
Isabella	23 Virginia M 03%

Iron Cnd	02% Wheel of Fortune 002%
Jack Pot	03% Work 02%

## MEXICO

Name of Company	State	Price
Alianza	Hidalgo	5
Amistad y Concordia	"	24
Angustias	Guanajuato	390
Arevalo y Anexas	Hidalgo	240
Asturiana y Anexas	Zacatecas	170
Barralon y Cabras	Durango	150
Bartolome de Medina	Hidalgo	100
Cabezon y An.	Zacatecas	20
Candelaria de Pinos	"	160
Capuzaya	Durango	120
Carmen	Hidalgo	400
Castellana y San Ram	Tepic	25
Cerro Colorado	Chihuahua	10
Cinco Senores y An.	Guanajuato	490
Concepcion y Anexas	S. Luis Potosi	100
El Oro	Guanajuato	40
Huapana y An.	Mexico	1,300
Guadalupe	Guanajuato	180
Huautla	Santa Ana	100
Luz de Borda	Michoacan	40
Luz de Maravillas	Hidalgo	100
Pabellon	Zacatecas	150
Palma	"	100
Paraisma de los Com.	"	5
Refugio y Va	Hidalgo	900
Restauradora	Durango	60
San Francisco	Hidalgo	270
S. Fed. Chalchihuites	"	12
San Rafael y Anexas	"	925
do, Frae Stock	"	400
San Rafael del Oro	Hidalgo	20
Ste. Maria de la Paz	S. Luis Potosi	850
Sirena	Durango	50
Soledad	Hidalgo	500
Sorpresas	"	250
Trinidad	Guanajuato	40
Tlaxiungo	Puebla	27
Union	Hidalgo	260
Zomelahuacan (gold)	Vera Cruz	180
Zona Min. de Pozos	Guanajuato	15

Note—The above Mexican stocks are figured on the basis of Mexican silver

## ORE TESTING

Complete mill for testing ores on practical scale by all processes to determine the best process adapted to treating any ore submitted. Processes in use investigated to overcome unnecessary losses, etc.

RICKETTS & BANKS,  
Metallurgists & Chemists

No. 104 JOHN STREET,

NEW YORK CITY

## Krogh Manufacturing Company

Successor to San Francisco Tool Co.'s Machine &amp; P'f'g Dept.

MANUFACTURERS OF AND DEALERS IN

## MINING AND PUMPING MACHINERY,

COMPRISING

Briggs' 2-Stamp Triple-Discharge Quartz Mill, of Latest Improved pattern, Rock Breakers, Ore Feeders, Concentrators, Engines and Boilers, Hoisting Rigs to be operated by Horse, Steam Power or any other motor; Ore Cars and Ore Buckets, Cornish and Jack-head Pumps, Triple-Acting Pumps, Centrifugal Sand and Gravel Pumps, Wooden Tanks and Pumps for the Cyanide Process, Pipe and Gate Valves, Link Chain Elevators for elevating and conveying all kinds of material. Estimates as to cost of machinery and its erection furnished upon application. Write for Catalogue and Prices.

OFFICE AND WORKS AT

51 Beale St. and 9 to 17 Stevenson St.,

San Francisco, Cal.

## ASSAY OFFICE

## Lew. E. Aubury, E. M.

Cyanide Plants erected and operated. Practical Working Tests made. Mines Examined and Purchased.

115 W. First St., Opp. Nat'k House Los Angeles, Cal.



The Southern California Lumber Co., Stinson Bldg., Los Angeles, Cal., Chas. Wier Manager, sells

## LUMBER

At Wholesale Prices

Mining Timbers a Specialty

Write for Prices

## FROM CRIPPLE CREEK

AIR COMPRESSORS,  
ROCK DRILLS,  
Stone Channelers,  
The Pohle Air Lift Pump,  
Coal Cutters,

The Ingersoll-Sergeant Drill Co.,  
HAYMEYER BUILD'G.  
NEW YORK.

New Catalogue No. 32

New Catalogue No. 41

Pamphlet No. 100

Catalogue No. 72

Special.

JAMES F. BURNS, Pres't. JOHN HARNAN, Gen. Man.

FRANK O. BECK, Sec'y and Treas.

## THE PORTLAND GOLD MINING CO.,

(Stock Transfer Office, Colorado Springs.)

Mines at Victor, Colorado.

COLORADO SPRINGS, COLO., May 19, 1898.

The Ingersoll-Sergeant Drill Co.,  
Gentlemen:—We bought two years ago one of the largest size of the straight line type of Ingersoll-Sergeant Piston Inlet Compressor.

This was found to be too small for our needs about a year ago and we purchased of you a Duplex Corliss machine 18" x 18" x 24".

This was set in place in our shaft house in the Cripple Creek District, 10,000 feet above the level of the sea, and has been running continuously ever since, and at times over ten 34" Eclipse drills. The steam cylinders were connected to an independent Jet Condenser, for which we are using the mine water, and the resultant economy of operation is very noticeable.

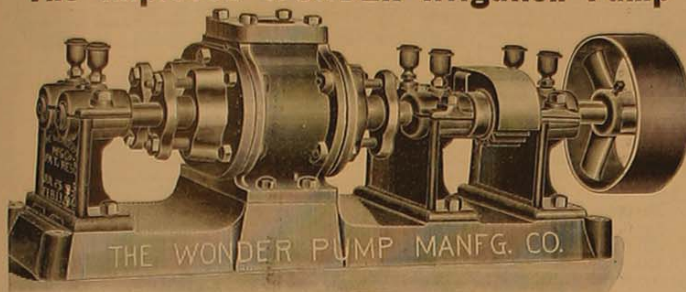
The operation of this Compressor is as near perfect as that of any machine we have ever seen, and this type is well worth the extra cost on account of the great permanent economy in operation.

Our mine is equipped exclusively with your drills and we have only the highest words of praise to give them.

Yours very truly, The Portland Gold Mining Co.,  
Jas. A. Burns, President



## The Improved WONDER Irrigation Pump



We also Build Vertical Style for Mining Purposes.  
Write for full particulars and Catalogue.

**Wonder Pump Mfg Co., KANSAS CITY, Missouri**

ALL THE MINING CAMPS OF UTAH AND COLORADO ARE  
LOCATED ON OR REACHED BY

**The Rio Grande Western Ry.**

THE SHORTEST, QUICKEST AND MOST DIRECT ROUTE TO  
**MERCUR AND CRIPPLE CREEK**  
P. A. WADLEIGH, GENERAL PASSENGER AGENT,  
Salt Lake City, Utah

**Harper & Reynolds Co.,**

✦ **MINING SUPPLIES** ✦

— AGENTS FOR —

**Judson Dynamite and Powder Co., Galvanized Spiral  
Pipe, Steel and Iron.**

152-154 North Main Street, . . . . . } LOS ANGELES, CAL.  
151-152 North Los Angeles Street, . . . . . }

**WHY**

Spend your money to buy new machinery to put on Un-  
proved Mines which may not be a success when you can  
buy Pumps, Hoists, Shafting, Pulleys, Air-Compressors,  
Engines, Boilers and in fact any Machinery you need for a  
Mine or Mill, as good as new, at the

**Denver Variety Machine Shops,** THOS. CROW, Prop.

Write for Prices and Particulars.

1712 Blake St., DENVER, COLORADO

**N. OHLANDT & CO.**

MANUFACTURERS OF

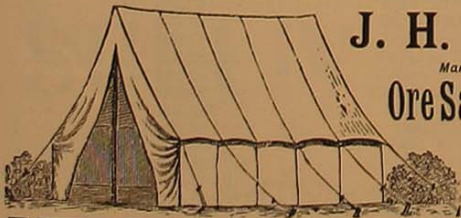
**Best Quality of BONE ASH for Assayers.**

Our Goods are used in all parts of the United States and Mexico.

EXTRA No. 1 and No. 2

CORRESPONDENCE SOLICITED

327 MARKET STREET, SAN FRANCISCO, CAL.



**J. H. MASTERS,**

Manufacturer of and Dealer in

**Ore Sacks, Tents and Camp**

Furnishings

215 Commercial St.,  
LOS ANGELES, CAL.

**Sulphuric Acid**

Manufactured by the **Denver, Col.**  
Western Chemical Co.  
For Chlorination, Refining and other  
processes. Also Muriatic and Nitric  
Acids, Blue Vitriol, Copperas Refined  
Sulphate of Soda, etc.

**THOMAS PRICE & SON**

**Analytical Metallurgical and Physical Testing Laboratory**

524 SACRAMENTO STREET, SAN FRANCISCO, CAL.

## COMPLETE CATALOGUE

Of Power Transmission, Appliances, Patent  
cold rolled steel shafting, Cast Iron Pulleys,  
Couplings, Ball and Socket self-oiling hang-  
ers, Floor Stands, Wall Frames, Belt Tight-  
eners, Wire Rope Sheaves, Band and Fly  
Wheels, Rope Transmission. Also valuable  
notes on engineering.

## MINING AND MILLING MACHINERY

Hoisting Engines and rollers, Automatic Ore  
Cars, Ore Buckets, Water Buckets, Blake  
Crushers, Hartz Digs, Hand Hoists, Hand  
Winches, Whims, etc.  
Catalogue mailed free to parties interested.

The Midland Foundry and Machine Works Co.  
DENVER, COLORADO

## GASOLINE ENGINES

Gasoline Engines from 2 to 10 horse  
power. Mine ventilators operated by  
Gasoline Engines.

TEMPLE MACHINE CO.,

1513 Wazee Street,

Denver, Colorado

## Roller & Cummins,

CHEMISTS AND ASSAYERS

Gold and Silver Bullion Melted, Refined and  
Purchased. Special Attention paid to samples  
by mail.

1821 Arapahoe St.,

Denver, Colorado

## Reliable Assays

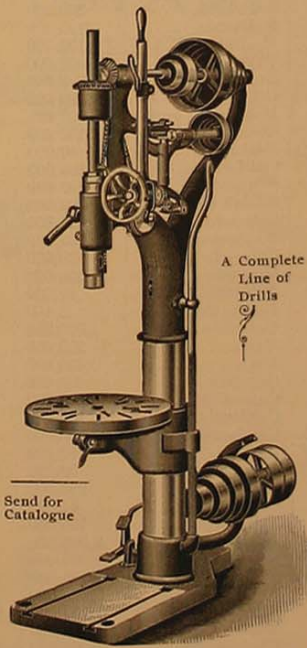
Gold .....	\$.50	Copper .....	\$1.00
Silver .....	.40	Gold, Silver and Lead...	1.25
Gold & Silver...	.75	Gold, Silver, & Copper...	1.50
Lead .....	.50	Gold, silver, copper, lead	2.00

Samples by mail receive prompt attention.  
Highest price paid for Bullion.

**Ogden Assay Co.,**

1420-16th Street,

Denver, Colo.



A Complete  
Line of  
Drills

Send for  
Catalogue

## UPRIGHT DRILLS

THAT ARE MADE BY

W. F. & JOHN BARNES CO.,

105 Ruby Street, Rockford, Ill.

ARE SOLD IN

San Francisco by

HENSHAW, BUCKLEY & CO.

Established 1872.

**F. E. BRANDIS, SONS & CO.**

ENGINEERING

**INSTRUMENTS**

FOR ALL PURPOSES.

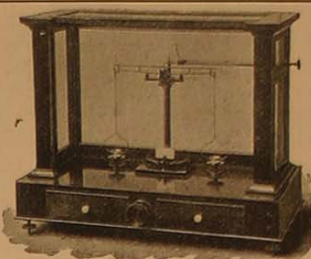
812-814 GATES AVE., BROOKLYN, N. Y.

Catalogues mailed on application.

Founded by Mathew Carey, 1785.

**HENRY CAREY BAIRD & CO.,**  
Industrial Publishers, Booksellers and Importers

810 Walnut St., Philadelphia, Pa., U.S.A.  
Our new and revised Catalogue of Practical  
and Scientific Books 32 pages, 8vo, complete to  
February 1, 1898, and our other catalogues and  
Circulars the whole covering every branch of  
Science applied to the Arts, sent free of postage  
to any one in any part of the world who will fur-  
nish his address.



## AINSWORTH NO. 045

Sensibility - - - - - 1-50 Milligramme

Eight inch beam, single rider attachment, and  
designed for a silver button balance to carry a  
heavy load. 3

**Wm. AINSWORTH**

2151 LAWRENCE ST.

DENVER, COLO.

## Assay Office and Ore Testing Laboratory

OF HENRY E. WOOD, Assayer

1734 ARAPAHOE ST.,

DENVER, COLORADO

Established in Colorado in 1876

Control and Empire Assays a Specialty. Wilkey  
Concentrator in Operation. Write for circular  
giving prices, etc.

## EAGLE PACKING



Also White Eagle, Graphite, Hydraulic, Nitr and  
other brands for all purposes for which packing  
is used. Write for samples and prices. Manu-  
factured by **James Glandling Co.,**  
1907-9 North 6th St., PHILADELPHIA, PA.

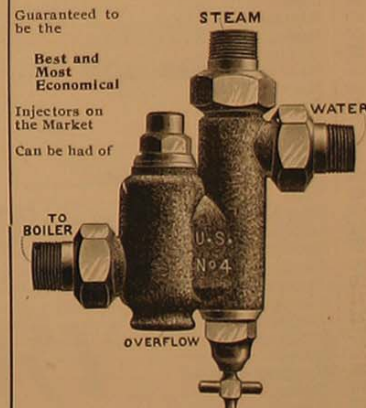
## U. S. AUTOMATIC INJECTORS

Guaranteed to  
be the

Best and  
Most  
Economical

Injectors on  
the Market

Can be had of



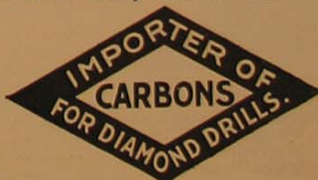
Mitchell Staver & Lewis Co., Portland, Or.  
Mitchell Staver & Lewis Co., Seattle, Wash.  
Schaw-Ingram Batcher Co., Sacramento, Cal.  
And of Jobbers and Dealers generally.  
Catalogue Free.

**American Injector Co.,**

Detroit, Mich  
U. S. A.

**I. C. YAWGER,**

SUCCESSOR TO  
VICTOR BISHOP & CO.



21 MAIDEN LANE

NEW YORK



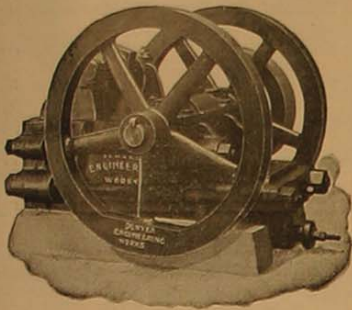
## INCORPORATED MINES PAYING DIVIDENDS.

	NAMES OF MINES	LOCATION	No. of Shares	Capital Stock	Par Value	Amount of last Dividend	Date of Last Dividend	Total Amount Paid in Dividends	Kind of Minerals Produced
1	Aetna Cons.	California	100,000	\$ 500,000	\$ 5	\$ 10	Oct 1898	\$ 150,000	Q.
2	Alaska, Treadwell	Alaska	200,000	5,000,000	25	37½	July 1898	3,550,000	G.
3	Alaska Mexican	Alaska	200,000	1,000,000	5	10	July 1898	299,031	G.
4	Alice	Montana	400,000	10,000,000	25	05	April 1898	1,075,000	G. S.
5	Alice	Utah	400,000	10,000,000	25	05	Sept 1898	2,525,000	S. I., G.
6	Anaconda	Montana	1,200,000	30,000,000	25	1 25	May 1898	6,750,000	C.
7	Anchoria Leland	Colorado	600,000	600,000	1	01	Oct 1898	162,000	G.
8	American Gold	Colorado	300,000	3,000,000	10	05	Sept 1898	336,000	G. S. I.
9	Atlantic	Michigan	40,000	1,000,000	25	1 00	Feb. 1898	7-0 000	S.
10	Bald Butte	Montana	250,000	250,000	1	03	Sept 1897	512,500	G. C. S.
11	Big Six	Colorado	500,000	500,000	1	00½	May 1898	15,000	G. S.
12	Boston & Montana	Montana	150,000	3,750,000	25	5 00	Aug 1898	8,375,000	G. C. S.
13	Bullion Beck and Champion	Utah	100,000	1,000,000	10	10	Oct 1898	2,535,000	G. S.
14	Bunker Hill and Sullivan	Idaho	300,000	3,000,000	10	07	Sept 1898	537,000	S. L.
15	Cariboo	British Col.	800,000	800,000	1	02	July 1898	220,965	G.
16	Calumet & Hecla	Michigan	10,000	2,500,000	25	10 00	Sept 1898	54,850,000	C.
17	Centennial Eureka	Utah	30,000	1,500,000	50	1 00	Mar 1897	2,010,000	S. L.
18	Central Lead	Missouri	10,000	1,000,000	100	1 00	Sept 1898	66,980	L.
19	Champion	California	34,000	340,000	10	25	April 1898	296,200	G.
20	Charleston	S. Carolina	10,000	1,000,000	100	1 50	Sept 1898	165,000	G.
21	Chloride Point	Utah	500,000	500,000	1	01	Dec. 1897	5,000	G. S.
22	Colorado Smelting	Montana	100,000	1,000,000	10	50	July 1898	1,595,000	G. S. C.
23	Crescent	Utah	24,000	600,000	25	00	July 1897	280,000	G.
24	Crowned King	Arizona	600,000	6,000,000	10	02	Aug 1894	184,000	G. S. L.
25	Daly	Utah	150,000	3,000,000	20	25	Mar 1897	2,925,000	S. L.
26	Deadwood Terra	S. Dakota	200,000	5,000,000	25	05	May 1898	1,350,000	G.
27	De Lamar	Idaho	400,000	2,000,000	5	29	May 1898	2,451,600	S. L.
28	Elkton Consolidated	Colorado	1,250,000	1,250,000	1	01½	Oct 1898	636,961	G. S.
29	El Paso	Colorado	650,000	650,000	1	01	Jan 1894	12,093	G. S.
30	Empire State	Idaho	75,000	750,000	10	10	Aug 1898	15,000	G.
31	Fern	British Col.	200,000	200,000	1	05	Jan 1898	110,000	G.
32	Florence	Montana	500,000	2,500,000	5	01	May 1897	32,530	S.
33	Geyser-Marion	Utah	300,000	1,500,000	5	02	Sept 1898	96,000	G.
34	Gold Coin of Victor	Colorado	1,000,000	1,000,000	1	01	Oct 1898	120,000	G.
35	Golden Cycle	Colorado	20,000	1,000,000	5	00½	Aug 18-8	155,000	G.
36	Gold Coin	Colorado	200,000	1,000,000	5	05	Nov 1897	160,000	G. S.
37	Gold and Globe	Colorado	750,000	750,000	1	3-10	July 1897	151,625	G.
38	Golden Reward	S. Dakota	1,000,000	1,000,000	1	15	Feb 1898	155,000	G.
39	Grand Central	Utah	250,000	250,000	1	12½	Oct 1898	156,000	G. S. C. L.
40	Hecla Consolidated	Montana	30,000	1,500,000	50	50	Feb 1897	2,175,000	S. G. I., C.
41	Highland	S. Dakota	100,000	10,000,000	100	20	Sept 1898	3,724,718	G.
42	Holy Terror	S. Dakota	300,000	300,000	1	03	Aug 1898	108,000	G.
43	Homestake	S. Dakota	125,000	12,500,000	100	50	Sept 1898	6,693,750	G.
44	Hope	Montana	100,000	1,000,000	10	10	Mar 1898	762,252	S.
45	Horn Silver	Utah	400,000	10,000,000	25	05	Sept 1898	5,210,000	S. L.
46	Idaho	British Col.	500,000	500,000	1	05	May 1898	264,000	G.
47	Iowa	Colorado	1,000,000	1,000,000	1	00½	June 1898	90,000	G.
48	Iron Mountain	Montana	500,000	5,000,000	10	1 00	Jan 1898	501,100	S.
49	Isabella	Colorado	2,250,000	2,250,000	1	00½	June 1897	270,000	G.
50	Kearsarge	Michigan	40,000	1,000,000	25	10	Aug 1897	160,000	C.
51	Kennedy	California	100,000	10,000,000	100	48	Aug 1898	1,796,000	G. S. L.
52	Last Chance	British Col.	500,000	500,000	1	04	Jan 1897	42,000	S. L.
53	Le Roi	British Col.	500,000	2,500,000	5	10	Apr 1898	775,000	G.
54	Lillie	Colorado	1,000,000	1,000,000	1	01	Sept 1898	134,110	G.
55	Minnesota	Minnesota	165,000	16,500,000	100	1 50	Oct 1898	4,735,000	L.
56	Modoc	Colorado	500,000	500,000	1	02	Nov 1898	75,000	G.
57	Montana Ltd	Montana	660,000	3,300,000	5	0½	May 1898	2,997,557	G. S.
58	Montana Ore Purchasing	Montana	40,000	1,000,000	25	1 00	July 1898	780,000	G.
59	Morning Star	California	2,400	240,000	100	5 00	June 1898	666,600	G.
60	Mt. Rosa	Colorado	1,000,000	1,000,000	1	02	Jan 1898	60,000	G.
61	Mercur	Utah	200,000	5,000,000	25	12½	Oct 1898	1,191,000	G.
62	Mammoth	Utah	400,000	10,000,000	25	05	Sept 1898	1,310,000	G. S. C. L.
63	Moon Anchor Gold	Colorado	600,000	600,000	1	07½	Nov 1898	261,000	G.
64	New York & Hon. Rosario	Central A.	150,000	1,500,000	10	10	July 1898	930,000	G. S.
65	Napa	California	100,000	700,000	7	20	Oct 1898	950,000	Q.
66	New Idria Quicksilver	California	100,000	500,000	5	20	Sept 1898	80,000	Q.
67	Ontario	Utah	150,000	15,000,000	100	75	Dec. 1897	13,542,500	S. L.
68	Osceola	Michigan	50,000	1,250,000	25	1 00	June 1898	2,272,500	C.
69	Parrot	Montana	230,000	2,300,000	10	30	July 1898	2,000,898	C.
70	Pennsylvania Consolidated	California	51,500	5,150,000	10	05	Aug 1898	43,925	G.
71	Pioneer	California	100,000	1,000,000	10	12½	Aug 1898	3,600	G.
72	Portland	Colorado	3,000,000	3,000,000	1	03	Oct 1898	2,250,080	G. S.
73	Princess	Colorado	1,000,000	1,000,000	1	00½	Feb 1897	47,000	G.
74	Quincy	Idaho	100,000	2,500,000	25	3 50	Aug 1898	10,120,000	C.
75	Rambler-Cariboo	British Col.	1,000,000	1,000,000	1	02	April 1897	40,000	G.
76	Raven	Colorado	1,500,000	1,500,000	1	01	March 1898	20,000	G.
77	Reco	British Col.	1,000,000	1,000,000	1	10	Jan 1898	237,500	S. L.
78	Republic	Washington	1,000,000	1,000,000	1	03	Oct 1898	30,000	G.
79	Sacramento	Utah	1,000,000	5,000,000	5	00½	Oct 1898	62,000	G.
80	Santa Rosalia	California	100,000	100,000	1	10	Feb. 1898	125,000	G. S.
81	Small Hopes Consolidated	Colorado	250,000	5,000,000	20	10	June 1898	3,300,000	S.
82	South Swansea	Utah	150,000	150,000	1	05	Oct 1898	125,000	S. L.
83	Standard	California	200,000	20,000,000	100	10	Aug 1898	5,674,940	G. S.
84	St. Joseph	Missouri	30,000	3,000,000	10	1 50	Sept 1898	2,747,000	L.
85	Silver King	Utah	150,000	3,000,000	20	25	Oct 1898	1,727,000	S. L. G.
86	Slocan Star	British Col.	2,000,000	1,000,000	0.50	05	Mar 1897	350,000	G.
87	Smuggler	Colorado	1,000,000	1,000,000	1	01	June 1898	1,035,000	S. L. Z.
88	Swansea	Utah	100,000	500,000	5	05	Oct 1898	120,500	S. L.
89	Tom Boy	Colorado	200,000	2,000,000	10	10	Dec 1896	605,000	G.
90	Tamarack	Michigan	60,000	1,500,000	15	3 00	June 1898	5,331,000	C.
91	Victor	Colorado	200,000	1,000,000	5	10	Sept 1898	1,000,000	G.
92	Vindicator	Colorado	1,500,000	1,500,000	1	05	Oct 1898	180,500	G.
93	Western Mine Enterprise	Montana	500,000	500,000	1	20	Jan 1898	48,680	G.
94	War Eagle	British Col.	2,000,000	2,000,000	1	01½	Sept 1898	239,000	G.
95	Wolverine	Michigan	60,000	1,500,000	25	1 00	Oct 1898	60,000	C.
96	White Water	British Col.	125,000	625,000	5	32	April 1898	194,000	G.
97	Yellow Aster	California	100,000	1,000,000	10	03½	Aug 1898	118,780	G.

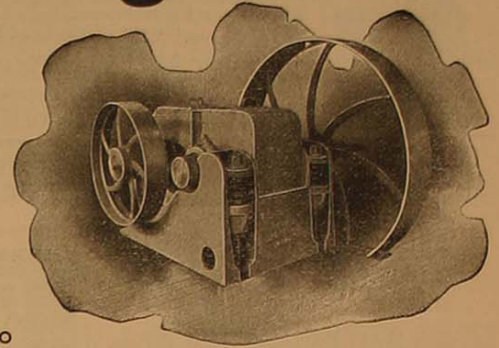
F, Silver. G, Gold. L, Lead. O, Copper. Q, Quicksilver. I, Iron. Z, Zinc.  
 N. B.—Companies not listed have not paid a dividend for the last twelve months.



# Crushers AND Crushing Rolls



Simple, Strong,  
Compact,  
Easily Accessible  
Few Parts  
High Speed  
Maximum Capacity



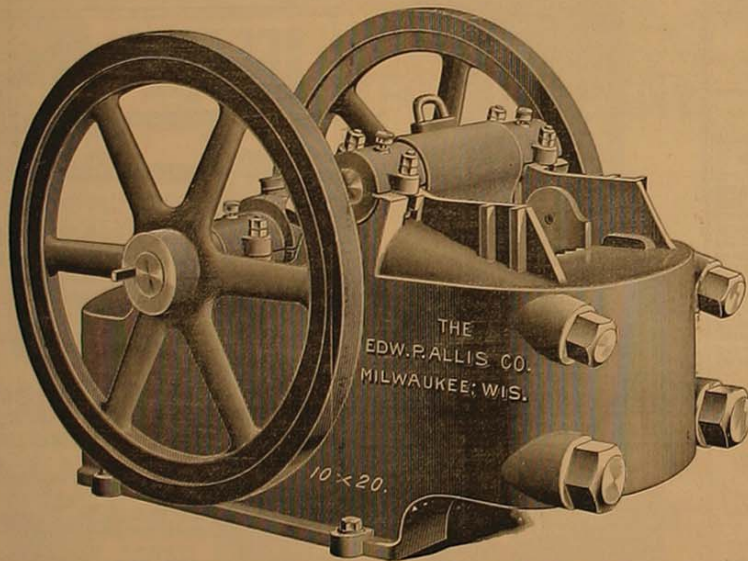
Denver Engineering Works,

Denver, Colorado

## Reliance ORE AND ROCK Crushers

ALSO MANUFACTURERS OF

RELIANCE  
CRUSHING ROLLS  
STAMP MILLS  
ORE FEEDERS  
AND RELIANCE  
VANNERS



This Cut shows our latest designs in Ore and Rock Crushers

CATALOGUE ON APPLICATION

THE EDWARD P. ALLIS CO.,

Milwaukee, Wis.

## SULLIVAN MACHINERY CO.

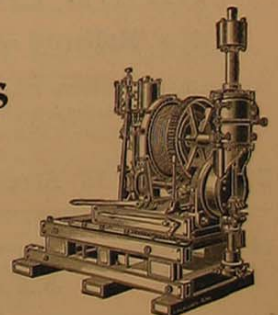
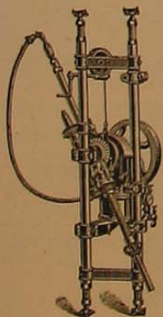
CHICAGO, ILLINOIS

Sullivan Diamond Prospecting Drills

FOR PROSPECTING FOR and DEVELOPING MINERALS

Rock Drills for Sinking, Drifting and Stopping

Knight & Stone, Agents, Spokane, Washington



Denver, Col. Office : 332 Seventeenth Street





## The Detroit Lubricators Are Best for MINING ENGINES

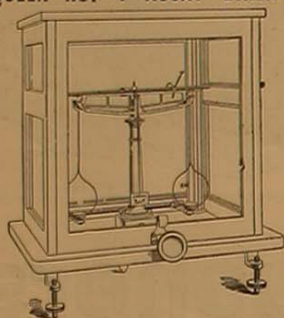
They are extra strong and durable, each one being tested at 300 lbs. pressure before being sent out, and they are always Efficient and Reliable.

Over 400,000 of Them are in Use.

Send for Catalogue, giving full details

DETROIT LUBRICATOR CO., Detroit, Mich.

### QUEEN NO. 4 ASSAY BALANCE



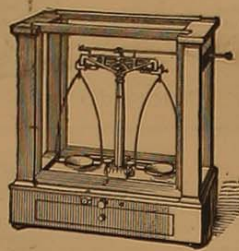
Aluminum Beam, Agate Knives and Planes Sensibility 1-100 mg. The Best Low-Price Assay Balance on the Market. Send for Circular.

QUEEN & CO.,  
Optical and Scientific Instrument Works  
1010 Chestnut Street,  
N. Y. Office, 59 Fifth Ave. Philadelphia

ESTABLISHED IN 1840

### HENRY TROEMNER,

170 Market St., Philadelphia, Pa.

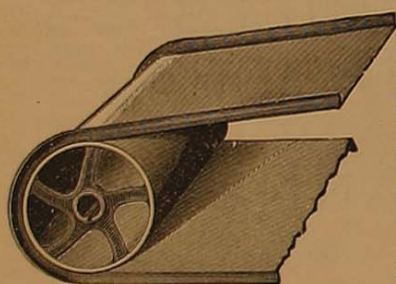


### Assay Balances and Weights

in use in all the U. S. Assay Offices  
in America

PRICE LIST ON APPLICATION

## Spadone's Concentrator Belts Patented



This illustration shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. We avoid this Mechanical Defect by our Spadone Cured Edge. Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

Send us your order for Water, Air Drill, Steam, Suction and Fire HOSE, RUBBER BELTING, RUBBER PACKING and LEATHER BELTING.

The Gutta Percha Rubber and Manufacturing Company,

30 and 32 FREMONT STREET,

SAN FRANCISCO, CAL.

## ASSAYERS AND CHEMISTS

### WADE & WADE

Best and Oldest Establishment in Southern Cal.

115½ N. Main St., Los Angeles, Cal

A. H. HANDLAN,  
President and Manager

E. W. HANDLAN,  
Secretary and Treasurer

## M. M. BUCK MFG. CO.

### Railway and Contractors Supplies

Machine Tools, Heavy Hardware and Metals; Mine, Mill, Smelter and Foundry Supplies; Manufacturers of Locomotive Head Lights; Train and Station Signal Lights, Lanterns, Oil Filters, Lubricators, Injectors, &c.

291 North 3d Street,

St. Louis, Mo.

## If You Desire Miners' Trade



## THE J. H. MONTGOMERY MACHINERY COMPANY.

1216 TO 1230 CURTIS ST., DENVER, COLO., U.S.A.

More than 4,000 in use. Made of wrought iron and steel. Can be packed on animals anywhere. The deadlock holds the load when an accident occurs.

20-Page Catalogue FREE.

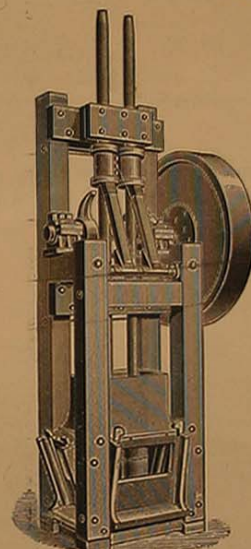


Price of One-Horse Whim, complete, with shieves.....\$90.  
Two-Horse Whims, complete, with shieves.....\$150.  
Pumping Attachment with Pipe for either.....\$40.  
Blower Attachment with Pipe for either.....\$30

Also Four, Eight and Twelve-horsepower Whims.

## All kinds of New and Second-Hand Machinery

## "HENDY" IMPROVED



### Triple Discharge Two-Stamp

Capacity six to ten tons per day  
PRICE, \$450.00

JOSHUA HENDY MACHINE WORKS  
38 to 44 Fremont St., San Francisco, Cal.



California Bellows Manufacturing Co.  
123 Beale St., San Francisco, Cal.

### BLACKSMITH BELLOWS

And Bellows of Every Description  
Write us for our new Catalogue

## L. Manasse Company



### Mfg. Opticians

88  
Madison Street  
Chicago.

Manufacturers and Importers of  
Architects,  
Engineers and  
Surveyors  
Supplies.

Optical instruments of every description. Barometers, Thermometers, Field Glasses, etc. Catalogues on application.

Remember the MINING and METALLURGICAL JOURNAL is the only Publication in the West devoted to the Mining Industry.

Offices—Stimson Block, Los Angeles, Cal.,  
Room 17-82 Nassau St., New York, N. Y.

## ANTIMONY.

We buy Antimony Ore in any quantity and pay prompt CASH for same. Write us and let us know what you have.

Chapman Smelting Works Co.,  
(INCORPORATED)  
422 Battery Street. San Francisco, Cal.

## WM. M. COURTIS, A. M.

★ Mining and Metallurgical Engineer

Assayer and Analytical Chemist

Office: 412 Hammond Building,  
Permanent Address, 449 4th Ave., Detroit, Mich.

## JEFFREY

Roller, Steel and Special Chains.

## ELEVATORS

## CONVEYORS

FOR HANDLING MATERIAL OF ALL KINDS.

WIRE CABLE CONVEYORS.  
For long and short distance conveying.

THE JEFFREY MFG. CO.  
Columbus, Ohio.  
41 DEY STREET, NEW YORK.  
Send for Catalogue.

Western Branch, - - Denver, Colorado  
Frank R. Field, Manager

## FOR SALE.

A 20 Stamp Mill, 4 Ore Feeders, 1 Blake Crusher, 10 Pans, 5 Settlers, 4 Frue Vanners, Howell-White Furnace, Revolving Ore Dryer, 125 h. p. Carliss Engine, 1 set Double Boilers (120 h. p.), 2 Hoisting Plants and Boilers, 1 Deep Well-Boring outfit and Assay outfit complete, located 8 miles from Railroad. Will be sold very low.

Apply Box 234.

Lordsburg, New Mexico,



**Quartz Screens**

A specialty. Round, slot or burred slot holes. Genuine Russia Iron, Homogeneous Steel, Cast Steel or American planished Iron, Zinc, Copper or Brass Screens for all purposes. CALIFORNIA PERFORATING SCREEN CO., 145-147 Beale St., S.F.

**Diamond Prospecting Drills.**

Machines of all Capacities

**American Diamond Rock Drill Co.**

120 LIBERTY ST., N.Y.  
P. O. Box 1442

**Pacific Coast and Mexican Agents**

FOR

Keasby &amp; Mattison's



**Magnesia Sectional Steam Pipe and Boiler Covering**

The only Covering that water will not destroy. Indispensable in covering pipes conducting steam to pumps in mines.

ALL KINDS OF ASBESTOS GOODS

DE SOLLA DEUSSING COMPANY,

Send for Testimonials.

44 Market Street, San Francisco, Cal.

**EDWARD B. READ,**

Engineers' Specialties, Cylinder and Machinery Oils, Cylinder Lubricators,

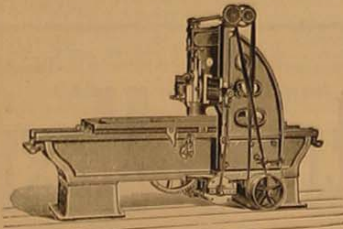
LORD'S BOILER COMPOUND, Cyclone Steam Flue Cleaner, Engine Compound Electric Spiral Packing, Shafting Compound, Crank Pin Grease, Wire Rope Grease, Extra Gear Grease, Belt Grease and Oil, Skin Grease, Elevator Grease, Crescent Flue Scraper, Oil Cups, Compound Cups, Dibble Lubricator, Packing and engineers' supplies. CORUNDUM WHEELS.

No. 12 First Street,

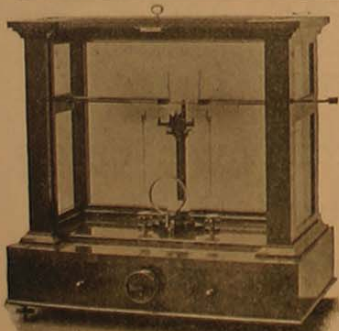
San Francisco, Cal.

**NEW HAVEN MFG. COMPANY**

NEW HAVEN, CONN.

**IRON WORKING TOOLS,**

Engine Lathes, Pulley Turning Lathes, Iron Planers, Slotters, Upright Drilling Machines, Horizontal Drilling and Boring Machines, Etc.

**HENSHAW, BULKLEY & CO., Agents, San Francisco, Cal.****SMITH & THOMPSON**

Manufacturers of

**Fine Assay Balances**

Write for Catalogue

2219 Stout street

Denver, Colo.

**J. B. Pope**

U. S. Mineral Surveyor,

SAN BERNARDINO, CAL.

**The Giant Powder Company**

+ CONSOLIDATED +

Principal Office: 430 California Street  
SAN FRANCISCO, CAL.

P. J. NOLAN, General Agent for Mexico  
Apartado 230 CITY OF MEXICO.

A. A. SPARKS,

Resident Agent Southern California,  
ROOM 438 Bradbury Block, LOS ANGELES, CAL.

**AGENTS**

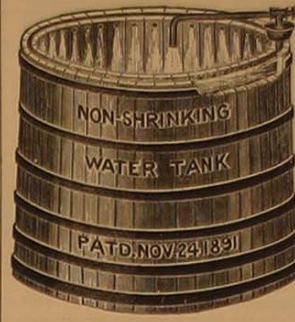
Roy & Titcomb, Nogales, Arizona  
Samuel Hill, Prescott, Arizona  
Kellner's Store, Phoenix, Arizona  
Thomas Wilson, Tucson, Arizona

A. Calderon, Hermosillo, Mexico  
G. Moller & Co., Guaymas, Mexico  
Wohler Bartling & Co., Mazatlan, Mex.  
Delius & Co., San Blas, Mexico

Julio Hilderbrand & Co., Durango, Mexico  
Julio Hilderbrand & Co., Tolia, Mexico

J. P. De Fresno, Culiacan, Mexico  
T. Robison Bours, Alamos, Mexico

Manufactures Dynamite, Black Blasting and  
Sporting Powders.

**TANKS**

OF EVERY DESCRIPTION

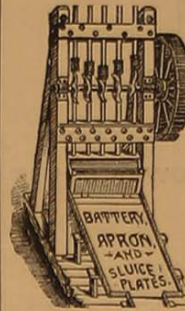
FOR

Mines, Mills and Cyanide Plants  
**Patent Non-Shrinking Water Tanks**

The only Tank that will stand the Desert and Hot Climate.  
Write for Catalogue and Estimate on any kind of Tank Work.

**Pacific Tank Co.**

33 BEALE ST., SAN FRANCISCO  
348 EAST 2d STREET, LOS ANGELES

**To Gold Miners!****Silver Plated Copper AMALGAMATING PLATES**

For Saving Gold In Quartz and Placer Mining.

EVERY DESCRIPTION OF MINING PLATES MADE.

Only Best Copper and Refined Silver Used. Old Mining Plates Replated. Twenty-six Medals Awarded. Gold, Silver, Nickel, Copper & Brass Plating.

**Denniston's San Francisco Plating Works**

653 and 655 Mission Street, San Francisco, Cal.

Telephone, Main 5931.

E. G. DENNISTON,

Proprietor

Send for Circular.

Assaying in all its Branches.

Determinations Accurately Made



The Bi-Metallic ....

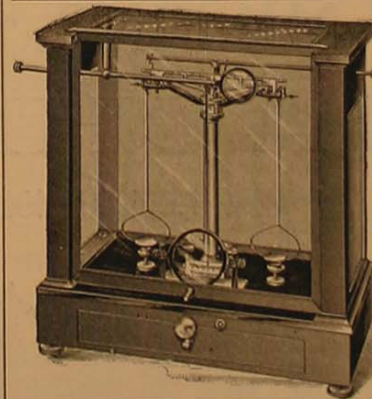
**Assay Office**  
and Chemical Laboratory

R. A. PEREZ, E. M., Manager

Formerly: Chief Assayer in El Paso Smelting Works, El Paso, Texas.  
Assistant Chemist Consolidated Kansas City Smelting and Refining Co.,  
Argentine, Kansas.

124 South Main Street,

Los Angeles, Cal.



ESTABLISHED 1859

**Herman Kohlbusch Sr.**

59 Nassau Street,  
New York, N. Y.

MANUFACTURER OF

**Fine Balances and Weights**

For every purpose where accuracy is required.

...

Send for Illustrated Catalogue

**THE WILSON**

Forged High Grade Steel

**Shoes and Dies**

Guaranteed to Wear Longer and Prove Cheaper than any others.  
Made by use of Special Appliances. Patented Aug. 16th, 1892.

— Made only by —

**WESTERN FORGE AND ROLLING MILLS**

St. Louis, Missouri

**JOSHUA HENDY MACHINE WORKS**

SOLE AGENTS

38 to 44 Fremont Street,

San Francisco, Cal.



# The JACKSON DRILL and M'F'G. CO.

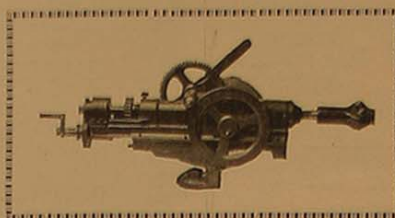
PRACTICAL EXPERIENCE.

SAN DIEGO, CAL., NOV. 11, 1898

The JACKSON DRILL & M'F'G. CO.,  
Denver, Colorado.

GENTLEMEN: I have used two of your Hand Power Rock Drills, which gave perfect satisfaction. One man can do the work of three men, and with much less exertion, thus making a great saving in expense. No mine can well afford to be without them.

Yours respectfully,  
(Signed) W. A. PTOLEMY



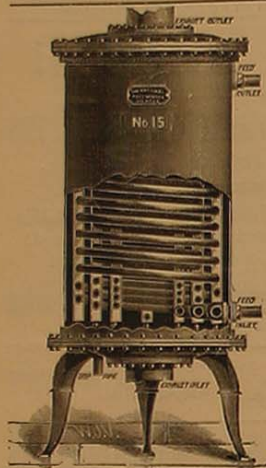
DENVER COLORADO

Dealer in

General Mining Machinery and Supplies

N. Y. Office, 120 Liberty Street,  
Cable Address, "Jack Drill," New York  
A.B.C. Code, (4th Ed.) and Lieber.

Send for Circulars and Testimonials



## The National Feed Water Heater

Highest Premium at World's Fair

800,000 HORSE POWER IN USE

SIMPLICITY  
CHEAPNESS  
RELIABILITY  
EFFECTIVENESS

Henshaw, Bulkley & Co.,

Agents,

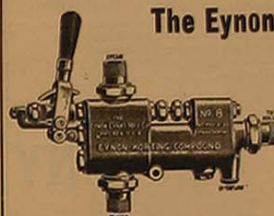
SAN FRANCISCO, CAL.

## P. & B. PAINT

FOR MINES, SMELTERS, CHLORINATION WORKS,  
THE CYANIDE PROCESS.

P. & B. Roofing put up in Rolls to lay 200 square feet, with Paint and Nails.  
Absolutely Acid and Alkali Proof.

PARAFFINE PAINT CO., Manufacturers, 312-314 W. 5th St., Los Angeles



## The Eynon-Korting Compound Injector

The Best for  
Quartz Mill  
and Smelter  
Boilers



Brass, Bronze and Copper Castings of every description.

Send for Catalogue of the  
Injectors, Condensers, Blowers, Ventilators, Blast Nozzles  
Syphons, Exhausters, Etc.

THE EYNON-EVANS MFG CO.,  
15th and Clearfield Streets, PHILADELPHIA, PA

ENRIQUE C. CREEL, President

JUAN A. CREEL, Manager

# Compania Industrial Mexicana

MANUFACTURERS OF

## MINING \* MILLING \* AND \* SMELTING MACHINERY

### STAMP MILLS

Engines,

Amalgamating Pans

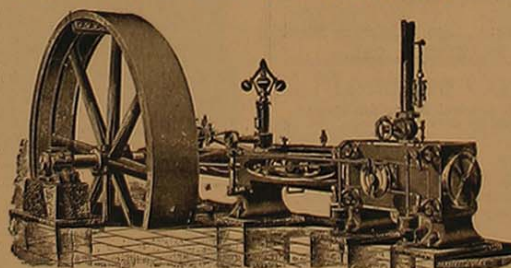
Hoists,

Huntington Mills,

Cyanide Mills,

Stamp Mill Mortars,

Air Compressors,



Crushers,

Boilers.

Amalgamating Plates, Cams Shoes & Dies

Roasters,

Electric Light Machinery.

### Concentrators

Pelton Water Wheels

Water Jacket Smelters,

Pumps,

Rolls and Jigs,

Ore Cars \* Slag Cars

We are prepared to meet any Prices, for Milling, Smelting and Mining Machinery  
Address all communications to the Company. Correspondence Solicited.

Chihuahua,

Mexico



# Why SEND YOUR MONEY EAST FOR

Shoes and Dies, Cams Tappets, Car Wheels, Shafting, Hangers, Pulleys, Ore Cars and Iron and Brass Castings, when they can be obtained for the same price and in less than half the time

AT THE

Albuquerque Foundry and Machine Works,

Repairing of Mill and Mining Machinery a Specialty, Albuquerque, New Mexico

# Ores! Ores! Ores!!

Gold, Silver and Lead Ores and Concentrates

Purchased at Reduced Rates for Treatment.

# Selby Smelting and Lead Co.

416 MONTGOMERY ST., San Francisco

Consign Shipments to Vallejo Junction, Cal.

## MINERS' OUTFITS.



IRON MORTARS,  
AMALGAM MORTARS,  
GOLD WASH PANS,  
MINERS' HORNS,  
BATEAS, CRUCIBLES,  
HORSE-SHOE MAGNETS,  
MAGNIFYING GLASSES,  
IRON RETORTS,  
CHEMICALS, SCALES,  
WEIGHTS, ETC.

Including a full assortment of Mine and Mill Supplies, Assayers' Materials, Etc.

Sole Agents for the Pacific Coast for the

W. S. TYLER WIRE WORKS CO.

Manufacturers of Steel and Brass Wire Battery Screens Agents for Baker & Adamson's Chemically Pure Acids. A full Stock always on hand.

Nitric Acid, sp. gr. 1.42; Muriatic Acid, sp. gr. 1.20; Sulphuric Acid, sp. gr. 1.845.

JOHN TAYLOR & CO.

63 FIRST ST., SAN FRANCISCO

Prices on application.

## The State Ore Sampling Co.

DENVER, COLORADO.

We buy Gold, Silver, Lead, Copper, Bismuth, Uranium, Wolfram, Cobalt, and Antimony Ores. With modern mills and machinery our facilities for sampling ores are the best.

Our long experience in the market enables us to pay the highest cash prices for all marketable ore. Write for our "Reference Book." Send analysis of your ore for prices and information.

BAILY & MONNIG, Managers.

## The Law of Mines and Mining in U. S.

BY D. M. BARRINGER AND JNO. STOKES ADAMS

A Practical and exhaustive treatise covering every part of Common Law, Statutory Enactment, decisions of the Courts, and Department rulings. Just the thing for the prospector, miner and mine owner. The law of mining is something that few mining men understand. The work is not at all local in character. It is as necessary to the coal and iron miner as to the miner of gold, silver, copper and lead. All the important cases connected with mining suits are carefully considered. One large octavo volume of nearly one thousand pages, bound in law sheep, delivered at any address on receipt of \$7.80. Address

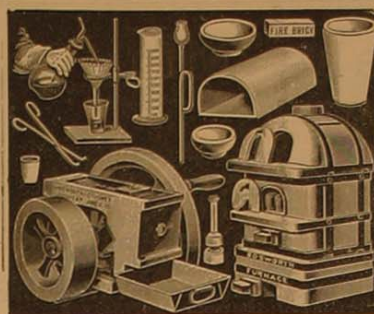
LITTLE, BROWN & CO., Publishers, 254 Washington Street, BOSTON, MASS.

## RIVETED SHEET STEEL WATER PIPE

For Placers, Water Powers, Irrigation, Etc.

## THE WEIGLE PIPE WORKS

2949-51 Larimer St. DENVER, COLO.



FACTORY:

3101-3141 Blake St., 1742-1746 Champa St., Denver, Col.

## Analytical Chemists and Assayers

Analysis made of ORES, Waters, Chemicals, Clays, &c. Umpire Work a Specialty

HAMLIN & MORRISON,

144 Chestnut Street, PHILADELPHIA, PA.

## TIMOTHY W. SPRAGUE, S. B.

WITH

CHARLES HENRY DAVIS, C. E. CONSULTING ENGINEERS

99 CEDAR ST., NEW YORK 4 STATE ST., BOSTON DREXEL BLDG., PHILADELPHIA Electric Transmission of Power and Mine Equipments

## FAUTH & COMPANY,

(G. N. SARGMULLER),

Engineering and Mining Instruments,

WASHINGTON, D. C.

Attention is called to our newly improved Mining Transit, with best Solar Attachment and Vertical Sighting Telescope and Quick Leveling Head.

This Cut Illustrates Our 4 H.P. to 8 H.P.

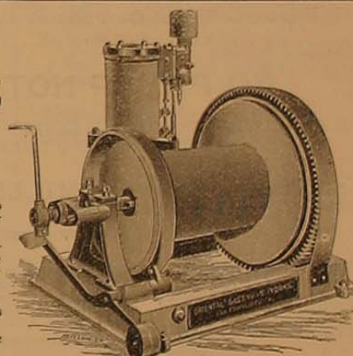
## Hoisting Plant

We also build larger sizes to suit the demands of our customers.

The Hoist illustrated is designed to lift 1,000 pounds 120 feet per minute with the smaller sized engine.

It is strong and exceedingly simple and durable, being entirely under the control of the operator, by the use of a single hand lever for hoisting, while the lowering is governed by a foot lever and brake.

No better device has been designed for this purpose. For prices and further information address the builders.



## ORIENTAL GAS ENGINE CO.

105 Beale Street, San Francisco, Cal., U.S.A.

# WHITE, ROGERS & COM'Y.

CONSTRUCTING ENGINEERS AND MILLWRIGHTS

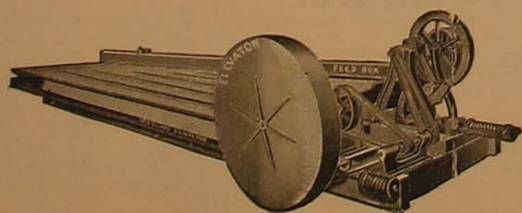
308 PINE STREET, SAN FRANCISCO, CAL.

Sole Pacific Coast Agents and Builders of the Celebrated

## WILFLEY CONCENTRATOR,

Price \$450 f.o.b. San Francisco

One of these Machines will take the place of TWO or THREE Belt Concentrators of any make and do very much better work.



WILFLEY CONCENTRATOR

We furnish superior Machinery and erect Stamp Mills, Hoisting and Pumping Works operated by Steam or Water Motors. Complete Concentrating and Smelting Plants for the concentration and recovery of gold, silver, copper and lead. Improved Power Drills and Air Compressors, Wire Rope Tramways, etc.

The Wilfley Table is fully covered by U. S. Patents Nos. 580,338 and 590,675.

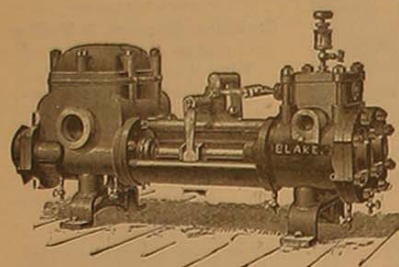
Infringements will be prosecuted to the full extent of the law.

These Machines are Kept in Stock Ready for Immediate Shipment



# Geo. F. Blake Mfg. Co.

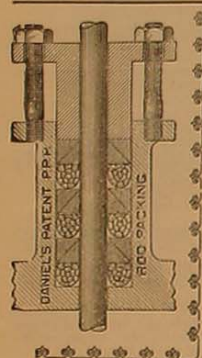
NEW YORK, N. Y.



Boiler Feed Pumps,  
Tank or Light Service  
Pumps,  
Combined Air and Circulating Pumps,  
Drainage and Irrigating Pumps,  
Special Fire Pumps,  
Independent Air Pumps  
and Condensers

Water Works and Power Pumps.

Henshaw, Bulkley & Co., Agents. San Francisco, Cal.



## DANIEL'S PATENT P.P.P. Diagonal Rod Packing

For Steam, Water, Oil,  
Air, Ammonia, Etc.

SAVES LABOR  
SAVES POWER  
SAVES MONEY



It Represents Highest Class Materials and Greatest Service.

### NO PAY IF NOT AS CLAIMED

SLIDING WEDGES, COMPENSATING FOR WEAR. OIL CUSHION TO ENAMEL AND LUBRICATE THE ROD.

Best Packing for use in MILLS, MINES and SMELTERS

MANUFACTURED ONLY BY

G. A. DANIEL, Philadelphia, Pa.

To insure getting the Genuine see that Every Box and Wrapper has our Trade Mark.

## GOLD and SILVER REFINERS & ASSAYERS.

Bullion Bought. No charges for parting: Gold \$20.30 per oz., Silver and Platinum at market prices. Assaying in all branches. Working tests made by all processes. Wastes and Concentrates bought. Prompt attention. Best Services. Your Trade Solicited

PENN SMELTING AND REFINING WORKS, 901-903 Filbert St. PHILADELPHIA, PA



## PERFORATED SCREENS

Steel Plate, Copper and Bronze

For all uses. Send for Catalogue

A. J. BECKLEY & CO.

Works, Garwood, N. J.

New York Office, 123 Liberty Street.

## Turbine AND Cascade WATER WHEEL

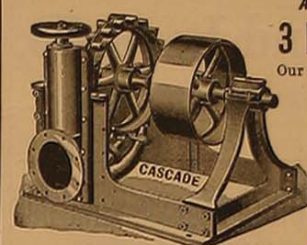
Adapted to all Heads from

3 Feet to 2000 Feet

Our experience of 33 YEARS building Water Wheels enables us to suit every requirement of Water Power Plants. We guarantee satisfaction.

Send for a Pamphlet of either Wheel and write full particulars.

James Leffel & Co.  
SPRINGFIELD, OHIO, U.S.A.



\$35,000,000 in Dividends paid out by Utah Mines up to date.

## UTAH MINING STOCKS

Weekly Market Report on application. Quotations by wire or mail. Reference: Any Bank in Salt Lake City.

P. J. CONWAY & CO.,

SALT LAKE CITY, UTAH

Mathematical, Scientific and Drawing Instruments



Boxwood Scales. All kinds of repairing promptly executed. GUIDO FERRARI

S. E. Cor. 7th & Chestnut Sts. Philadelphia, Pa.

Third Edition Revised and Enlarged.

### Prospector's Field Book and Guide

In the search for and the easy determination of another useful minerals, by H. S. Osborn, of 58 engravings 274 pages, by mail \$1.50. Catalogue M. Mining, Assaying, etc., sent free.

PHILADELPHIA BOOK CO.

18 S. Ninth Street, Philadelphia, Pa.

## CONGREVE

## Boiler Compound

WILL REMOVE SCALE GRAESE and DIRT from Steam Boilers without injury to the steel.

The Compound is Free from Acid

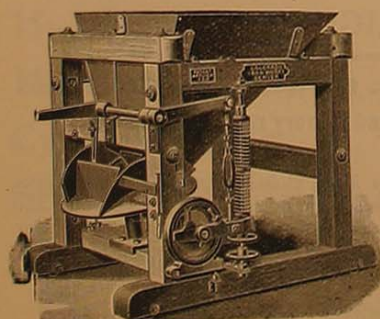
Write for Circulars

Address, Congreve Boiler Compound Co.

Lucas Avenue, St. Louis, Mo.

When Installing a Tramway Have the

The Only Automatic  
(Double rope) Tramway Built



CHALLENGE ECLIPSE ORE FEEDER  
Will feed both wet and dry ores

## Finlayson Patent Automatic Wire Rope Tramway

Economy  
in Operation

Simplicity in  
Construction

Easy  
Running

## THE COLORADO IRON WORKS COMPANY

ESTABLISHED 1860

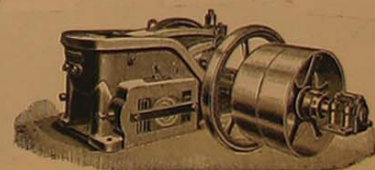
DENVER, COLORADO.

SOLE MANUFACTURERS

ENGINEERS AND MANUFACTURERS OF

Ore Milling  
and Smelting  
Equipments

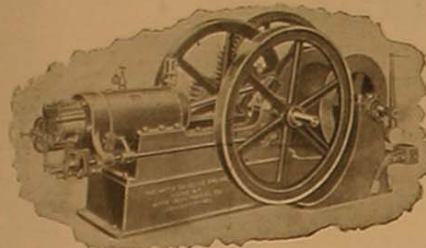
CATALOGUE ON APPLICATION



BLACK HAWK ORE BREAKER



# Witte Gasoline Hoister



Uses Gas, Gasoline, Distillate, Naptha or Kerosene. Requires no Coal, Wood or Engineer and little water. Guaranteed absolutely safe, reliable and durable. Single or Double Drums, Right or Left Handed Geared or Friction.

CHAS. B. BOOTHE & CO.,  
LOS ANGELES, CAL.

WITTE IRON WORKS CO.,

1201 Walnut Street,

Kansas City, Missouri

Send for Catalogue B



Engineers' and Draughtsmen's Supplies

Sole agents for Riefler's round system drawing instruments and Albert Ott's Planimeters, Plantographs and other instruments of precision. Levels and transits of superior make.

P. WEBER & CO.,  
1125 CHESTNUT ST., PHILADELPHIA

Subscribe for

the Journal

THEODOR LEXOW

195 Broadway New York

Importers of

CARBONS

— FOR —  
DIAMOND DRILLS and all Mechanical Purposes  
Henry Demmert



# The M. & E. Co. MACHINERY and SUPPLIES

MINING HOISTS, WHIMS, ORE BUCKETS,

Bates Corliss Engines, Snow Steam Pumps

OIL CITY BOILERS AND ENGINES,

Hercules Gas Engines, Lawrence Centrifugal Pumps

ELECTRIC LIGHTING, RAILWAY and TRANSMISSION APPA-

RATUS, WASHBURN & MOEN MFG. CO'S WIRES

AND CABLES.



ALSO DEALERS AND JOBBERS IN

Shafting, Belting, Dodge Wood Pulleys, Hangers, Boxes, Etc.

WRITE FOR PRICES

The Machinery and Electrical Company,

351 & 353 N. Main Street,

Los Angeles, Cal.

# HALLIDIE PATENT ROPEWAY

— FOR THE —

Transportation of Ore, Fuel and other material, has been erected by us all over the country and is the most economical and efficient method known. Nothing to get out of order; has always given satisfaction.

California Wire Works

[LICENSEES]

Office, 330 Market St, San Francisco, Cal.



Mention the Journal

EASTERN PRICES BEATEN IMPROVED FACILITIES, FINEST WORK LOWEST PRICES



PERFORATED SHEET METALS

For Flour and Rice Mills, Grain Separators, Shaker Screens, Gravel and Cement, Revolving and Shot Screens, Stamp Batteries, Iron, Steel, Russia Iron, American Platin, Zinc, Copper and Brass Screens for all uses. Inventor and Manufacturer of the celebrated Slot Burred and Diagonal Slot punched Screens.

MINING SCREENS A SPECIALTY

Mill owners using screens extensively, can contract for large supplies at favorable rates J. W. QUICK is the only competent and successful manufacturer of Screens on the Coast, having furnished Screens to the Principal Mills of

California, Nevada, Alaska, Mexico, Arizona, Central America, Australia and British Possessions.

San Francisco Pioneer Screen Works

(Established 1860)

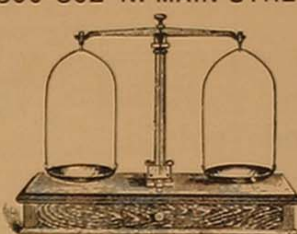
221 and 223 FIRST STREET, SAN FRANCISCO.

J. W. QUICK, Prop.

# C. DUCOMMUN,

300-302 N. MAIN STREET,

LOS ANGELES



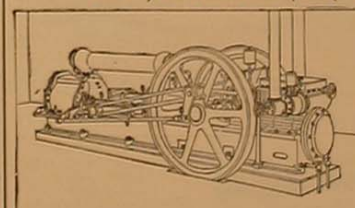
Assayers Material  
Mine and Mill Supplies

Dixon's Black Lead Crucibles, Denver Fire Clay Crucibles, Muffles, Scorifiers, etc.; Quicksilver, Drill Steel, Retorts, Mortars, Gold Pans, Drilling Hammers, Drifting Picks, Horn Spoons and Shovels.

# NORWALK IRON WORKS CO.

SOUTH NORWALK, CONNECTICUT.

# THE NORWALK AIR and GAS COMPRESSOR



In use in every State in the Union, Central America, and South America, Great Britain, etc., Also used by the U. S. Army and Navy.

Especially Designed for  
Driving

ROCK DRILLS,  
PNEUMATIC LOCOMOTIVES, ENGINES, PUMPS  
COAL CUTTERS.

And Other Mining Machinery. The Best Machine for Compressing Air for all Dynamic Purposes. Send for Illustrated Descriptive Catalogue.

HENSHAW, BULKLEY & CO., Agents San Francisco

HOME MANUFACTURE  
FOWLER'S

Fossil Asbestos Manufacturing Co.,  
Sectional Removable Covering  
for Steam Boilers, Pipes, etc.  
As a Non-Conductor, Unequaled  
Absolutely Fire Proof

G. C. FOWLER, 656-58 Howard Street,  
San Francisco, Cal.



HOFF ASBESTOS MFG. CO., Bryson Block,  
Los Angeles, Cal., Agent for Southern Cal.

# WIRE TRAMWAYS

Ropeways,  
\* Incline Planes,  
and Railways.

Hoisting Apparatus, Patent Grip Pulleys, Transmission of Power by Wire Ropes; 25 years experience; Send for Ropeway Pamphlet.

Pacific Coast Agents for

# The Calhoun Excavator

A combined power Shovel and Cableway for excavating and handling earth or loose rock.

SEND FOR DESCRIPTIVE CIRCULARS



**Buyers of**

ALL CLASSES OF  
BULLION, MATTE,  
ORE, SILVER SUL-  
PHIDES,  
CYANIDES, GOLD  
and SILVER BARS.

# CONSOLIDATED Kansas City Smelting AND Refining COMPANY

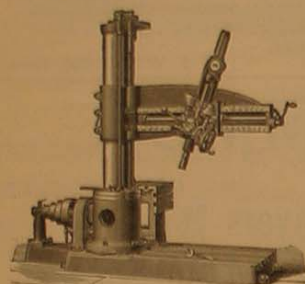
SMELTING WORKS  
LEADVILLE, COLO.; EL PASO, TEXAS;  
ARGENTINE, KAN.; BOQUILLAS, MEX.

REFINERY:  
ARGENTINE, KANSAS

ORE PURCHASING AGENCIES:  
C. D. Porter, Spokane Wash.; J. H. Weddle, Leadville, Col.;  
J. H. Murray, Denver, Colo.; L. P. Feustman, City of Mex.;  
J. E. Jackson, Salt Lake City, Utah; H. R. Simpson, El  
Paso, Texas; C. R. Pinney, Argentine, Kansas.

**Manufacturers of**

ALCHEMIST-  
BRAND  
BLUE VITROL  
ZINC SULPHATE

**Half Universal Radial Drills**

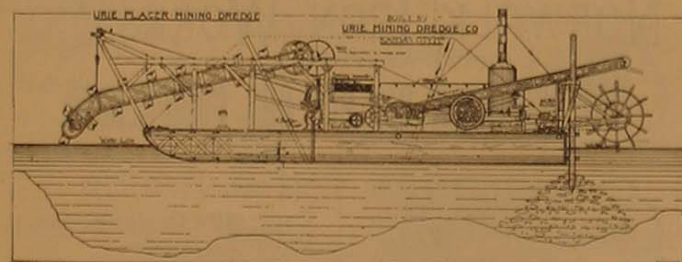
The special features which have so highly recommended this style of Drills are our double columns, steel gearing, power and hand feeds, quick return motion to spindle. Furnished in three sizes, with large variety of tables, adapting the drills for every class of work possible.

**Bickford Drill and Tool Co.**

CINCINNATI, OHIO, U. S. A.

HENSHAW, BULKLEY & CO., AGENTS

San Francisco, Cal.

**PLACER MINING DREDGES**

Adapted to all classes of work, any capacity. We built first mining dredge in use.

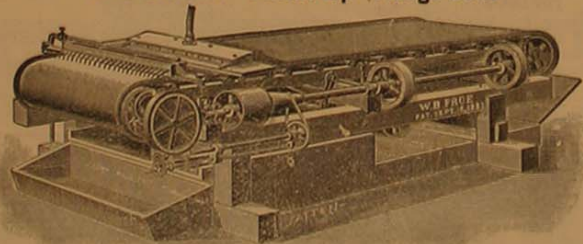
**URIE MINING MACHINERY CO.**

607 W. 5th Street,

Kansas City, Mo.

## FOUR and SIX FOOT FRUE VANNERS

With Brownell "Patent Lip" Flange Belts



After a Concentrator like the Frue Vanner has been on the market nearly two decades, and the sales have constantly increased, it is safe to say it is the "Standard Machine of the world." More Frue Vanners have been sold during the last twelve months than for the same period at any time during the history of the machine. Practical mining men in all parts of the world where mining is carried on will testify as to its merits. It is the "Standard" which all competitors are trying to imitate.

The results obtained by this machine are the "Acme" of concentration, and several cheap and unfitted machines that have lately come on the market compare by it, and the manufacturers will tell you that they are "just as good, and cheaper, etc." The facts are that no other concentrator made has an equal capacity, or will yield as clean a concentrate with as small loss in the tailings as the Frue Vanner. The amount saved from the lower first cost of an inferior machine counts little in the years results, when compared with the increased output from a Frue. This machine not only gives better results at both ends of the belt (i. e. Clean product and poor tailings), but is operated at less expense and requires less attention than any other machine on the market. At the Alaska Treadwell Mine where they have ordered over 300 Frue Vanners one man attends 48 machines for 21 hour shift.

FOR DESCRIPTIVE PAMPHLETS, ADDRESS

JAMES S. BROWNELL, Western Agent  
132 Market Street,

**FRUE VANNING MACHINE CO.**

(Successor to Adams & Carter)

SAN FRANCISCO, CAL.

## Randsburg Gold Fields

REACHED VIA

**Santa Fe Route**

Leave Los Angeles, 10:20 a. m.  
Leave San Bernardino 12:10 p. m.  
Arrive Barstow 3:15 p. m.  
Leave Barstow 3:55 p. m.  
Arrive Kramer, 5:05 p. m.  
Arrive St. Elmo, 5:15 p. m.  
Arrive Johannesburg 5:50 p. m.

Returning Trains Leave  
Johannesburg 9:00 p. m.  
Arrive San Bernardino 5:35 a. m.  
Arrive Los Angeles, 8:30 a. m.

A through passenger coach is run between Barstow and Johannesburg.

Through tickets and particulars of any Santa Fe Route Agent.

Stage leaves Johannesburg for Ballarat on Sundays and Thursdays at 7 a. m.; returning arrives at Johannesburg on Tuesdays and Fridays at 8 p. m.

**SAN FRANCISCO OFFICE**  
628 MARKET ST.

**LOS ANGELES OFFICE**  
200 S. SPRING ST.

ESTABLISHED 1887

C. L. BERGER & SONS  
Successors to

**BUFF & BERGER**

Surveying and  
Engineering Transits

With patent interchangeable auxiliary. Telescope for use on top or side in vertical sighting. Our friends are cautioned against infringements foreign or domestic as attempts have been made of late to mislead the public.

Send for Illustrated Catalogue and Manual

11 Province Court, Boston, Mass.

## F. A. JONES, E. M.

Assaying

In all its branches. Analytical Determinations. Agents for Shippers at the Smelters.

Chemist. State Geological Survey.

V. H. GOTTSCALK, B. S., Assistant  
14 W. Missouri Ave., Kansas City, Mo.

## A Stamp Mill ★

Especially adapted for the prospector who requires something Cheap, Strong, Light, Efficient, and that will save the values.

Price \$300.00

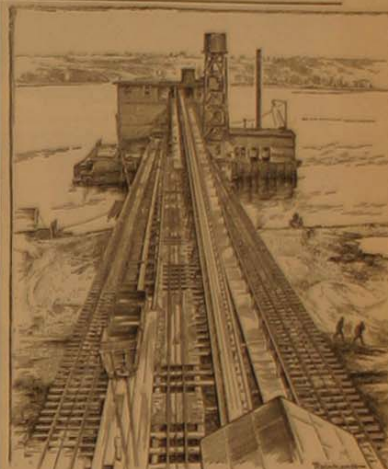
The Stokesberry Rotary Stamp Mill

Enterprise Machine Works, Denver, Colo.

## SWEEPINGS ★

Metallic Wastes, Dental Scraps, Photographers' Wastes, Jewelers' Sweepings, Mill Wastes, Amalgamated Plates, Old Iron Retorts, Old Quicksilver bought.

A. M. DONALDSON & CO.,  
1661 Larimer St., Denver, Colorado



FOR conveying Ore, Coal, Slag and Matte. Send full particulars of your wants in writing for prices.

Robins Conveying Belt Co.,  
147-149 CEDAR STREET, NEW YORK

**JOHN. T. REED**

Assayer and  
Analytical Chemist

Assays made for all valuable metals. Analysis made of all valuable minerals. Special attention given to the sampling of mines. Estimating the value of and testing the nature of their ores. 100 pound lots of ore sampled, and working tests made by Cyanide, Amalgamation and Chlorination Processes.  
OFFICE 522 COURT STREET,

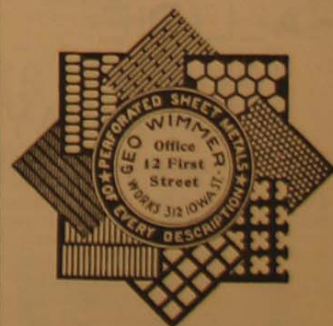
San Bernardino, - - California

E. E. BURLINGAME'S

## ASSAY OFFICE

Established in Colorado, 1866. Samples by mail or express will receive prompt and careful attention. Gold and Silver Bullion refined, melted and assayed, or purchased.

Address 1736 and 1738 Lawrence St., Denver, Col.



MANUFACTURER AND DEALER IN

## Perforated Sheet Metals,

Steel, Russian Iron, American Planished Zinc, Brass and Copper.

Mining Screens of Every Description  
SAN FRANCISCO, CAL.



# THE PUEBLO Smelting and Refining Company,

PUEBLO, COLORADO.

BUYERS OF

Gold, Silver, Lead and Copper Ores,  
Copper Matte and Bullion.

## Refiners of Gold, Silver, Lead and Copper.

Manufacturers of Bar and Pig Lead, Lead Pipe, Antimonial Lead, Copper Ingots,  
Granulated Test Leads and Litharge.

Pays Highest Prices for all classes of Ores.

Especial Attention to Sampling by most Approved Processes.

Quick Returns on all Consignments.



**CHAS. B. BOOTHE & CO.**  
MINING AND MILLING MACHINERY AND SUPPLIES,

Hoists, Horse Whims, Buckets, Wire Rope, Ore Cars

129 SOUTH LOS ANGELES STREET,

LOS ANGELES, CAL

# RISDON IRON WORKS,

SAN FRANCISCO, CALIFORNIA

Cable Risdon's, Code—A. B. C. & Leibers

MANUFACTURERS OF



**GOLD DREDGING MACHINERY AND COMPLETE EQUIPMENT** for Placer Mines, OUR SPECIALTY.

We build Gold Dredges Complete in Running Order to handle 2,500 cubic yards per day at a cost of 3 cents per cubic yard.

We excavate 50 feet below water, 20 feet above water and handle boulders up to one ton weight. Send for Dredging Catalogues Nos. 15 and 16.

We also build all kinds of Mining, Milling Concentrating, Pumping, Air Compressing, Hydraulic, Water Wheel and Hoisting Machinery.

EVANS' HYDRAULIC GRAVEL ELEVATORS.

We publish 16 Catalogues. Write for one in the line you are interested in.

Highest Known Grade of Cyanogen

# CYANIDE OF POTASSIUM

GUARANTEED 99 PER CENT. AND OVER. IN 112-lb ZINC LINED CASES.

MADE BY **THE GAS LIGHT AND COKE CO.,**

Works at BECKTOWN near LONDON, ENGLAND,

FOR PRICES  
ADDRESS

**Schoellkopf, Hartford & MacLagan, Ltd.,** Sole American Agents

No. 3 Cedar Street, NEW YORK CITY





## FRASER & CHALMERS

### Mining Machinery

133 Fulton Street,  
Chicago, Illinois, U. S. A.  
43 Threadneedle Street,  
E. C., London, England

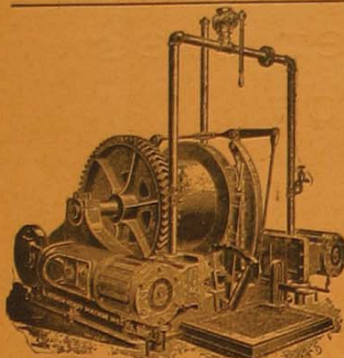
STAMP MILLS  
ROCK CRUSHERS  
HUNTINGTON MILLS  
SMELTING FURNACES  
GRAY'S PATENT  
MINE CHAIRS

CONCENTRATORS  
HOISTING ENGINES  
ROASTING FURNACES  
BALL PULVERIZERS

CORLISS ENGINES  
SEDERHOLM BOILERS  
RIEDLER PUMPS  
RIEDLER AIR COMPRESSORS  
PERFORATED METALS  
A SPECIALTY

The accompanying picture shows our Improved Adjustable Comet Crusher.

Fraser & Chalmers, GENERAL AGENTS FOR GREEN BLOWERS



DOUBLE CYLINDER HOISTING ENGINE

## JOSHUA HENDY MACHINE WORKS, Nos. 38 to 44 Fremont St.

SAN FRANCISCO, CAL.

Manufacturers of and Dealers in

The Latest Improved

Quartz Milling, Pumping, Hoisting and Smelting  
Plants, Air Compressors and Rock Drills.

"HENDY" IMPROVED "TRIPLE-DISCHARGE" TWO-STAMP QUARTZ MILLS  
Boilers, Engines & Pumps of all capacities

PLANS, SPECIFICATIONS and ESTIMATES OF COST SUBMITTED and CONTRACTS ENTERED INTO  
FOR FURNISHING and ERECTING MINING and MILLING PLANTS for all conditions of Use.

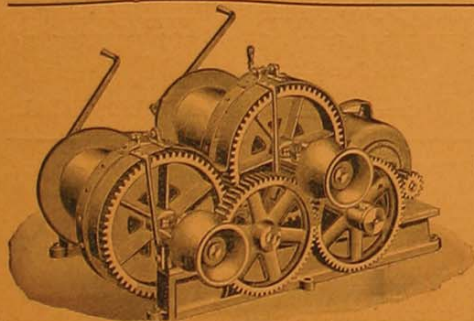
## BAKER IRON WORKS

LOS ANGELES, CALIFORNIA

Manufacturers of

Mining and Milling Machinery, Atlas Engines and Boilers, Worthington Steam Pumps

Water Works Machinery  
A SPECIALTY



## LAMBERT HOISTING ENGINES

ELECTRIC HOISTS  
BUILT TO CAUGES AND TEMPLATES  
500 STYLES AND SIZES

Prospectors and Contractors Engines  
Single and double drums with  
and without boilers.

Mining Engines and Electric Hoists,  
with single, double or triple drums.  
Friction or reversible.

SEND FOR NEW CATALOGUE R, 140 PAGES.

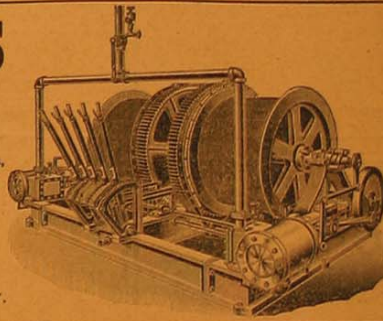
LAMBERT HOISTING ENGINE CO.

MAIN OFFICE AND WORKS:

117 POINIER ST., NEWARK, N. J.

117 Main St., CAMBRIDGEPORT, MASS.

143 Liberty St., N. Y.



## Mining Timbers and Construction Lumber

(California Long Leaf Yellow Pine Lumber)

Prices given for delivery to any point in Mexico by Rail through Porfirio Diaz, Nuevo Laredo or Paso del Norte, and by Vessel through Gulf Ports of Tampico and Vera Cruz.

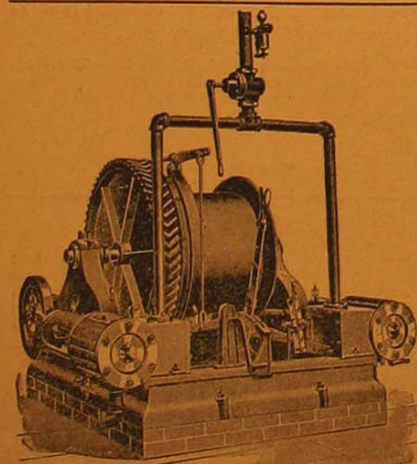
## Bradley-Ramsay Lumber Co.

LOUISIANA, U. S. A.

ADDRESS INQUIRIES FOR PRICES TO

R. N. WATSON, AGENT.

APARTADO NO. 118 MONTERREY, N. L. MEXICO



## PARKE & LACY COMPANY

21 and 23 Fremont St., San Francisco, Cal.



## MINING MACHINERY

SOLE AGENTS FOR  
THE INGERSOLL-SERGEANT AIR COMPRESSORS AND ROCK DRILLS.  
SOLE LICENSEE FOR THE MANUFACTURE AND SALE OF

THE ROPP STRAIGHT LINE FURNACE, For Roasting, Chlorinating and Desulphurizing Ores.  
WE CARRY IN STOCK

Horizontal, Vertical and Portable Engines and Boilers. Rock Breakers, Cornish Rolls, Pulverizers, Concentrators, Ore Feeders. Hoisting Engines, Horse Power Hoisting Whims, Water Wheels, Steam Pumps, Ore Cars, Wire Rope, Ore Buckets, Water Buckets, Skips. Blowers and Exhaust Fans, Shafting and Pulleys, Belting, Oils and Mine Supplies. Maganese Steel Shoes and Dies

Estimates Furnished for Complete Plants for Hoisting Works, Smelters, Concentrating and Stamp Mills.